



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

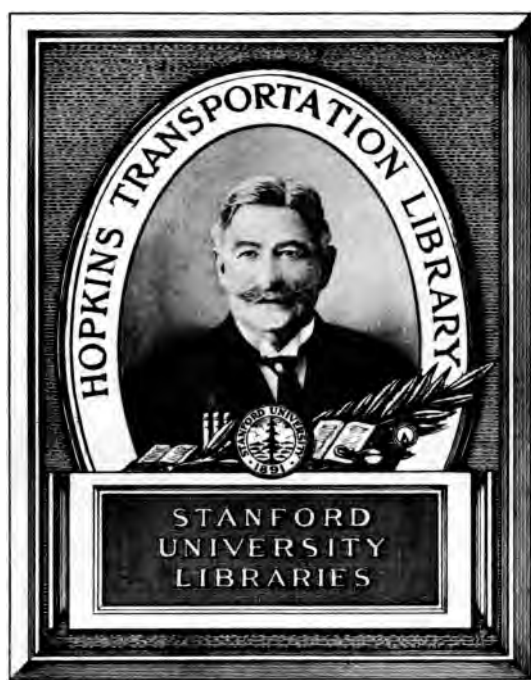
About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>

SKETCH
OF A RAILWAY.
1841

Harmer's Library
624

846



.....
ied
.....

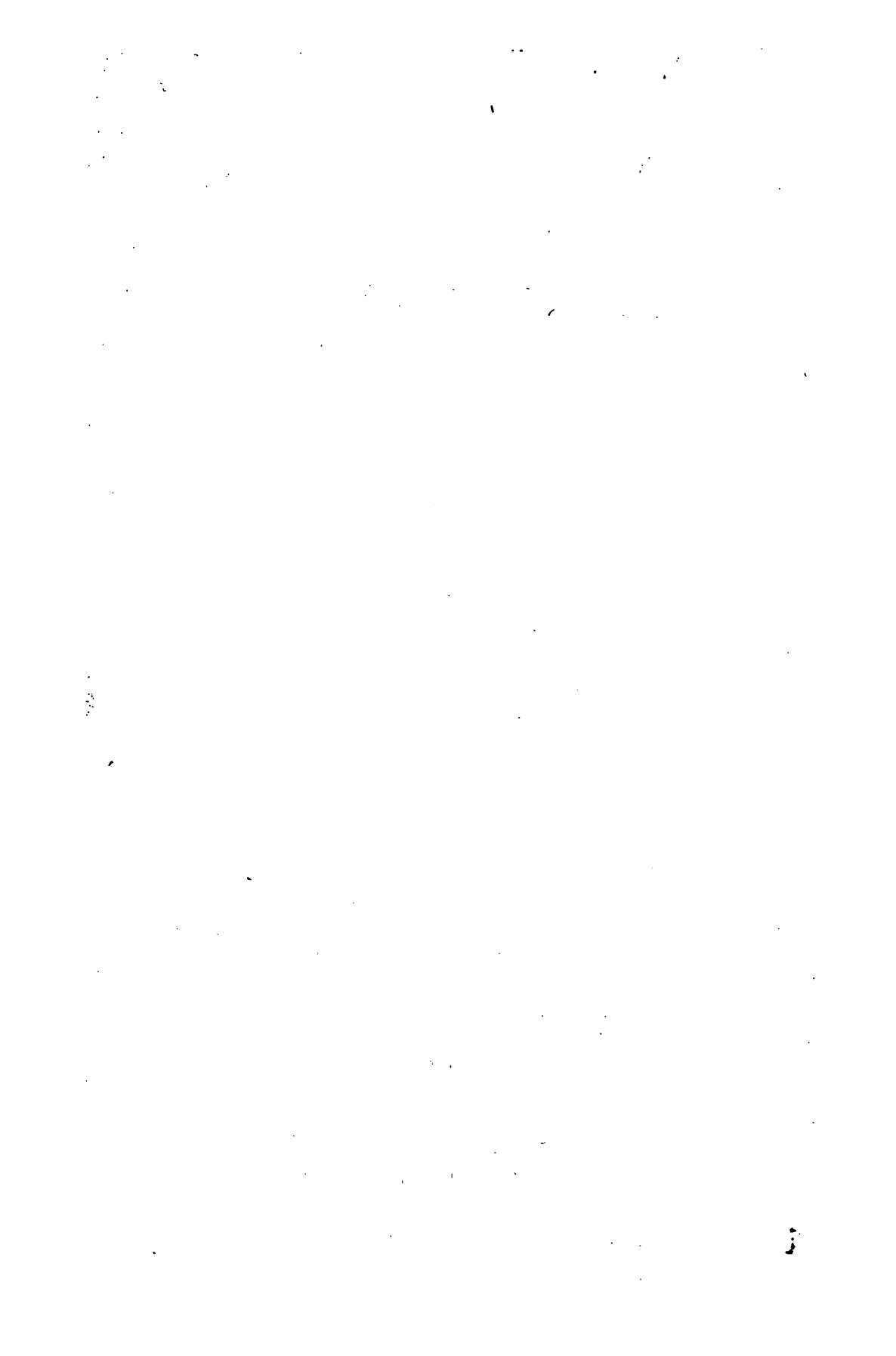
Railroad

HE 2771

P456

copy

\$15.00





SKETCH
OF A RAILWAY
JUDICIOUSLY CONSTRUCTED
BETWEEN DESIRABLE POINTS.
EXEMPLIFIED
BY A MAP
AND
AN APPENDIX OF FACTS.

What is obvious is not always known, and
What is known is not always present.—JOHNSON.

New-York :
PUBLISHED BY EGBERT HEDGE, RAILROAD JOURNAL OFFICE,
120 NASSAU STREET.

1841.

Entered according to Act of Congress, by ROBERT HEDGE, in the year 1941, in
the Clerk's Office of the Southern District Court of New York.

TO
LOUIS Mc LANE, Esq.,
AS
A PRACTICAL AND ENLIGHTENED ADVOCATE
OF
THE RAILWAY SYSTEM,
THIS
SKETCH
IS
RESPECTFULLY INSCRIBED.

INTRODUCTION.

THE annexed map by showing the naked outlines of the artificial means by which Pennsylvania is enabled to vent the products of her agriculture and of her coal and her iron mines, will present them in their relations of one with the other, more distinctly to the reader, and as regards the canals he will there find the loss from a want of uniformity of size, to be but too apparent. The belt of country embraced in this map, is perhaps more favored than any other in the United States, with these main springs to production and consumption.

The strides which steam power is making in all directions cannot be unperceived. It is bringing the whole world into nearer and kindlier contact, and among ourselves, is the most effectual destroyer of sectional differences, and seems specially sent, in its application first on rivers and subsequently on railways, to disappoint the fondly cherished hopes of the enemies of human freedom and progress, that our institutions are but a rope of sand.

Among the new and useful purposes, in this country, to which it will soon be applied, is in the transportation to the seaboard, by railway, of the coal and iron trades, down the valley of the Schuylkill, by which a *considerable reduction* will be effected in the prices of those articles of the first necessity, and the supply of them made constant. Recent experiments in England have placed this coal at the head of the list, in economical properties as a fuel, and in the manufacture of iron it is now no longer an experiment. In few other ways, therefore, could the community at large be more truly benefitted.

The city of Philadelphia is here found to be already advantageously connected with the far west by her present mixed improvements, and as a most central entrepot for exchangeable intercourse, whether externally or with the interior; having also the opportunity to improve the latter, by connecting herself by railway with Cleveland on lake Erie, which would give her by much the advantage in proximity to the trade of the lakes and of the far west, over all her rival sisters (44). It will be well that she encouraged what little foreign commerce remains to her, but the advantages in this respect, which belong to New York as a seaport, would be amply shared by her, if the railway connection in particular, between them, could be given all the *efficiency* of which it is susceptible (41.) That Philadelphia is overlooked in the extensive foreign steam intercourse now projecting all around us, may bring her in that particular, not to overlook herself, since she is about to possess such additional advantages in fuel. Her natural career, however, is, and will be more emphatically manufactures, when once she shall have secured an *uninterrupted access* to her coal and iron mines, which cannot therefore be too much insisted upon, as well for her own sake, as for that of her neighbors.

Railways like all new enterprises, have been attended in their progress with disappointments, as the necessary stepping stones to ultimate success, and in proportion as these have been severe, is it hard afterwards to instil generally the belief, that success has been at last attained. We are in fact in the midst of it, yet it is unrecognized by the majority. The moment is therefore, most opportune for our purpose, of bringing this fact home to the community, particularly, as the feeling of the necessity for this improvement, is daily gaining ground, by the fact of its constant extension, at the same time that there still lingers an unfounded mistrust in regard

to its security as an investment. The evidences of its superiority over all other internal improvements, exist already in abundance, and are daily accumulating. These, however, have so far, been too scattered and disjointed, to produce the desired effect, but which it is now hoped they will, by being thus collected into one frame work. As the largest private investment in the United States, it is a subject likely to attract attention, particularly as it has still to contend against powerful adverse interests, and deep rooted prejudices.

It may be remarked as complimentary to this improvement that the leading cities, of the seaboard, are now building their best hopes of success in the race of generous rivalry with each other, on the railway. Boston is urging eagerly forward her connection with the Hudson river at Albany, and thence with the lakes (43.) Baltimore is equally strenuous to get to the coal mines at Cumberland on the Potomac, and so on to the valley of the Ohio. Philadelphia and New York, however, are comparatively supine, with equally high objects to attain: the one to bring the lakes within two to three days of her door at all seasons; the other to place her prosperity almost beyond the reach of chance, by opening a cheap and perennial stream from her coal and iron mines.

In holding up to distinction the Philadelphia and Pottsville railway more particularly for its natural advantages, and the very *wide range* of dependence on its trade, we did not forget that it is equally remarkable as a work of art, for the skilful application of which, it is indebted to its engineers, MESSRS. MONCURE and WIRT ROBINSON, whose names will always be honorably associated with this GREAT WORK.

S K E T C H .

CANALS (14),

It is commonly supposed are but little perishable, and require but little annual outlay to keep them in business order. This impression has been industriously kept up by their advocates, but the developements of late years are beginning to satisfy the public that it is erroneous, and that the casualties from the frost, droughts, vermin, breaks, deposits, etc., together with their exposure to be periodically swept away by freshets, cause them, in this country at least, to be very expensive, and where they are in use for only two-thirds of the year. By consulting the reports of the canal commissioners of the States and of private companies, it will be found that the ordinary expense of maintenance, repairs, etc., of a canal average \$1,000 to \$1,200 per mile, (21) besides being constantly exposed to heavy extraordinary demands, more particularly where they run parallel to and are fed from our *rapid* streams, and in the season when they are idle and useless.

RAILWAYS (1),

On the other hand have, during the last ten years, been gradually establishing their better adaptation to our climate. Operating at all seasons, and being now made to carry freight of every description, as well as passengers, this useful combination has fully earned for them in this country and in England the title of the "better improvement of the age." So evident are their advantages to a community, that a neighboring one without them soon becomes impatient of their absence, and not merely a desire, but a *necessity*, is now almost everywhere felt for their extension (28). By an examination of the working of some of the modern railways it is found that from \$700 to \$800 per mile, per annum, is enough to repair and maintain them; and while they are generally so located as to be little exposed to extraordinary demands, any sudden casualty can be remedied at comparatively little expense, and what is still more important, at but little loss of time.

Such are the general outlines of the canal and railway: they are both doubtless expensive to maintain; and with either so far this feature has in general been the more marked, from their little show of business. The Erie and Schuylkill, being both monopolies, have been singular instances among canals in which this feature, though equally marked, has been concealed, the first taking one million and a half of dollars in tolls for 363 miles, and the latter a half a million for 100 miles. Among railways the Utica and Schenectady, though of slight structure, being one of the most successful, its expenses have also been less glaring; but measured by its relative *capacity and more general utility*, we are decided in calling the railway the less expensive of the two.

This remarkable success, particularly of the Erie canal, which, with the aid of the *salt and auction duties*, had been made so soon to extinguish its cost, created quite a canal mania among the States and private companies, who disregarding difference of location and other circumstances, and before there was much light from experience, gave that system the preference; and which we believe has proved far more disastrous than had that of railways *been permitted* to share more of their attention (7).

Of the truth of these outlines it is first necessary to be well convinced—not by borrowing the ideas of others, but by an investigation for one's self. Could this credit system in thought be thus abolished, and the labor of our own reflection and examination be substituted, schemers would have less sway. Conforming to this rule, we have bestowed much care in the investigation of the present condition of the railway system, and have selected one for description, which, *taken as a whole*, we can present as an unrivalled model, particularly for freight, in regard to their fitness for which there yet remain some unfounded doubts. This railway is now in course of completion, and is the one between

PHILADELPHIA AND POTTSVILLE.

1st. *Its Grades.*—A level throughout would generally be the most desirable profile, but it is seldom attainable for any considerable distance. This railway is a singular exception, being a succession of levels and moderate descents in the direction of its trade of 19 feet to the mile, for the whole distance of 94 miles, between the Coal Mines and the Delaware, with the exception of one mile of 40 feet, which can be easily overcome by an additional locomotive, at an an-

nual expense of \$5,000, or only one cent per ton, on an annual business of 500,000 tons, and were it double that sum it would still be an inconsiderable item.

2d. The motive power, wagon and car department are all on the most improved models, and nearly free from those liabilities which added formerly so much to the expenses under that head. And in the late great improvements in the locomotive much additional power has been attained. Ten years ago it was thought a great deal to draw 30 to 40 tons on a level, now 400 to 500 tons are quite practicable, a gain which is the more important, as it nearly obviates the necessity and expense of obtaining very moderate grades, which are, therefore, not now so much regarded either in this country or in England.

It has been a great desideratum to obtain a suitable engine for freight or burthen trains. The 8 wheeled engine with 4 drivers, having 2 tons adhesion on each, and moving at a speed of 10 to 12 miles per hour, has been used on this road, and found to be of great power and economy, having proved equal to the traction of 4 to 500 tons gross load down the road in the direction of its trade, and 2 to 250 tons up the road over the 19 feet grade, in one train respectively (3). This engine was made by Messrs. Eastwick and Harrison, of Philadelphia. Improvements, however, are still progressive, and such as shall hereafter be approved of, this road will be free to adopt. A new plan of a burthen engine is at present constructing by Messrs. Baldwin & Co., of Philadelphia, to weigh 11 tons on 6 wheels, over which the whole weight will be diffused, and the whole traction obtained from it, with equal ease on the curves. Norris' establishment may now be called, in this branch, the great workshop of Europe. In Baltimore, also, Mr. Ross Winans has much improved his peculiar form of freight engine, and has recently built one on 8 drivers, weighing 19 tons, all of which serves for adhesion, and must be equal to any load within the power of the couplings, and if not given to spread the track on the curves, will be a great acquisition to roads with heavy grades. Patterson and Lowell engines are also entitled to rank among the best in the country; and in the workshops on railways (17) we have always met with a laudable spirit of rivalry in remedying defects as they are developed by actual practice, and which has assisted to bring the locomotive into its present useful form. It will be only with the immense tonnage over the Philadelphia and Pottsville railroad that mechanics, in the branch of locomotives, particularly those of Philadelphia, all established on


the line of it, will find the most suitable field for the exercise of their skill, and where it can be stimulated to the highest efforts for supremacy, already so far ahead of England, their great rival, as to give them the supply of some of her own roads, and most of the Continental ones.

Locomotives of the same weight or adhesion, on their drivers, should all draw alike, but the superior excellence and nice adjustment of their machinery, will be shown in such of the locomotives of equal weight, as will deliver the most coal, between, say the minimum of 15,000 tons and the maximum of 30,000 tons annually, at the least expense of fuel, repairs, etc. And it will of course, be the object of the company, that their engines be managed only by real mechanics, who have multiplied and improved with the other branches of the railway. It should be particularly noted of this road, that its large and heavy business can be done with the lighter engines(2).

3d. The road formation is here nearly all of a character, being of rock or red shale, becoming very soon consolidated, and with attention to it at first, will very shortly cease to require any outlay. The frost, in the northern parts of the country being an insuperable difficulty, must be of primary consideration; and it is therefore that the cross tie or sill, of a stout size, laid on trenches of broken stone, has been here adopted, as the quickest in attaining a firm foundation, and when deranged by this evil, as being the readiest, and therefore the cheapest to adjust, without interruption to the business of the road. Where a gravel bed is attainable, the derangement from frost might be lessened.

But as we cannot hope to overcome at once all the defects of a road, it only remains, after giving it the requisite solidity of rail and sill, to reconcile or palliate them as best we can. The most fruitful source of wear and tear are the inequalities on the road, which can only be best provided against, as done on this road, by lightening the weight of engine on the rail, and by keeping a succession of sentinels posted along its whole line, constantly employed in the adjustment of the road while the traffic is passing over it; which it is shown further on can be done at a charge of only \$32,500 per ann. for the 100 miles, the facility of thus applying this indispensable attention unremittingly, without interruption to its business, giving to this plan of road for the northern sections of our country, a preference in our view, over every other more complicated and less accessible. And should more than the above charge become neces-

sary, it could only be the consequence of augmented traffic, which would bring with it of course a commensurate compensation, and its increase therefore could only be desirable. The rails (9) on this road

are of this form  weighing 45 lbs. for 54 miles, and 52 lbs per yard for 40 miles, of this first track intended ultimately for the upward or light traffic, and are in lengths of 18 ft. 9 in., being so proportioned as to produce the most efficient distribution of those weights, and are fastened with Mr. Robinson's patent, so far the best contrivance for that purpose.

In respect to the strength of this rail it has been ascertained by experiment, to be equal to a pressure of 8 to 10 tons at its weakest point; and as it is mainly against injury from the locomotive that the rail is to be protected, those above described with a pressure of only 2 tons on each wheel, against a power in the rail equal to the resistance of 8 to 10 tons, have been deemed the most desirable, as affording the margin, which has been found in England the best guarantee against the bending or deflection of the rail, and as indispensable for safety and economy in doing a large business. On the second track, for the downward and heavy trade, a heavier rail may be adopted if deemed advisable.

As regards the wear and tear from the pressure of the trains of cars, it is small, as compared with that from the locomotive. Those for the coal business, will be made substantial, with strong springs, weighing each about $1\frac{1}{2}$ tons, with a load of coal of $3\frac{1}{2}$ tons; together $5\frac{1}{4}$ tons or $1\frac{1}{4}$ tons on each wheel, against a power in the rail, as already stated, of 8 to 10 tons. Adopting the true basis of economy, both to the road and its machinery, that of keeping it constantly adjusted and level, the safety and regularity of the business will be insured; and in regard to the great item of coal, it will thus be passed over the 94 miles of this road without any loss in weight, which is not even found to occur in cars without springs over the rattling and inferior lateral roads of from 1 to 20 miles from the mines to the navigation; the loss sustained being only in throwing the coal into the cars at the mine, and emptying it out at the landings, which must happen in any case, and averages about 4 to 5 per cent. Already does the flour by this road from Reading, command a preference over that by the Columbia road, from the better condition in which it is delivered in Broad street.

4th. We will now consider what appropriations are necessary for the maintenance and perpetuation of the road.

The rail itself, as now made, with the upper surface of good malleable iron, requires scarcely any appropriation. By one experiment on the Liverpool and Manchester railway, it was found that at the rate of wear in 21 months, after 600,000 tons had passed over it at high velocities, the loss was only $\frac{1}{111}$ th of its primitive weight, so that it would require more than 100 years to reduce it to half its original strength. And the French engineers, who have recently examined the subject, consider the wear of the rail as scarcely an item.

Occasional defective rails will tear or exfoliate by the wheels at certain periods of weather, slipping under the engine, but being turned they will last a long while ; and if thrown out, the iron being free of duty, will always fetch more than it cost, and the loss is scarcely that of the labor of replacement.

But we will assume that it will require renewal in 30 years, and allowing the price of iron to remain the same, although likely to be cheaper, 8,500 tons will be required for a single track of 100 miles, say at \$40 per ton, (40 per cent. off for old rail,) makes \$340,000, or an annual appropriation per mile, of - - - 113

The most perishable portion of the railroad then is, its wooden structures :—

1st. The sills, (22) of which there are about 170,000 to the 100 miles, being a little over a yard apart, they cost in the first instance, including laying them down, \$1 each ; and allowing that they will last 10 years, for which there is experience under proper drainage, the cost of sill and replacing it, will not exceed 50 cents each, (part of the labor being provided in the item for adjusting the road,) and it makes \$85,000 for the whole line, or per mile per annum - - - 85

2d. The bridges, on the assumption that they cost \$450,000 on the whole line, and that they will last 25 years, under superior care, it would require to replace them an annual appropriation per mile, of - 180

For the adjustment and levelling of the road, it is found that two men at stations of 2 miles apart, are enough ; their pay is \$27 per month each, and allowing as an average, that number to be kept *constantly* on the

road, it gives \$32,500 for the whole line per annum,	
or per mile, - - - - -	325—703
For office and incidental expenses, salaries, house rent,	
etc., - - - - -	100
For extra motive power, water stations, wharves, etc.,	250—350
	<u>\$1,053</u>

Thus will \$703 per mile per annum for the whole line of 100 miles, to include sidings and turnouts, ensure the road being kept constantly true and its whole superstructure perpetually renewed, while \$350 additional per mile will pay for management and extraordinary demands, making in all a full allowance of \$1,053 per mile per annum.

The charge for adjustment of \$325 per mile per annum will be required from the outset, and, as already insisted upon as the wisest economy, should not be spared.

But as regards the appropriations for rails, sills, and bridges, it would be more just to the original subscribers, who bore the brunt in carrying the work through, that they were not retained from the first earnings of the road, but say after four to five years of operations, as the earliest possible period, agreeable to the experience on the Massachusetts railways, at which a good and well-cared for road would expend more than \$400 to \$500 per mile per annum in adjustments and slight repairs; after which it would seem fairer to graduate the annual provision for renewals with the progress of its business and profits (25), which in right locations have a greater tendency to increase faster than on any other improvement. It should also be remembered, that by the time the outlay for renewals will commence, that for the road bed will have nearly ceased, so that the cost of perpetuating a good and well managed railway is far from extravagant.

It is therefore to this branch of the subject that we would particularly draw attention, as when well understood, and in the face of an abundant business on the road, it would remove the apprehension so prevalent with the public of the extraordinary perishable and expensive nature of the railroad as compared with a canal, which is, in fact, the most so, and is moreover one-third of the year useless and then most liable to casualties, as pointed out in the beginning.

A portfolio, in which is preserved the working drafts of every structure on the road (not generally adopted), will facilitate much the replacements and repairs, and at less waste of money and time.

The line of road, also, which has proved itself *entirely aloof* from all injury by freshets (40), has unusual facilities in the abundance of wood, iron, and mechanic skill for the repair and renewal of both road and machinery, and its whole system, in short, results in an economy which it would be difficult to realize any where else, and of which the road itself is the great cause, by cheapening and freely circulating everything within reach of its influence.

Compare then this property to real estate. Is it not built on the same foundation as a house, composed of the same materials, and if solidly and properly constructed at first and as much cared for afterwards, why should it be more expensive proportionately to perpetuate, and if connecting desirable points, will it not in general yield a better income with less trouble and taxation?

We would again refer to the moderate cost of perpetuating and keeping the road level, as the true criterion by which to judge the value and safety of this species of investment. And if exception be taken to the terms of duration allowed by us to the superstructure, it will be seen how small an addition of charge to each item permile will cover any stinting on this score; and to be fully covered we shall allow in our estimate further on, about \$200 per mile per annum, in addition to \$240 per mile per annum allowed for extraordinary demands, making the whole annual charge per mile per annum, \$1,250, as a most ample allowance.

5th. The fitness of its terminations, which is defined by the amount of business between them to justify the outlay in its construction; and here it must be admitted that no other two points of the same distance in the United States furnish an equal amount, or where the cost of transporting it, as now conducted, is so enormous, the amount of tonnage now passing on this line averaging 6 to 700,000 tons per annum, and the charges on the greater portion of it in tolls, freight, wastage, handling, etc., amounting to about \$1,500,000.

The trade too, must in the very nature of things increase (17), and with it the waste and uncertainty attendant on its delivery at market. Where else then is the economy of steam power so much wanted, or where it can fortunately be so profitably applied, it being clearly many times cheaper, weight for weight, to carry coals and

other minerals than passengers, for the reason, that of the latter, the locomotive rarely obtains more than a tenth of a load or of her power, while of the former she can always obtain full loads and exert her full power at half the velocity, to which the injury is always in a compound ratio, and is therefore a great saving in wear and tear, while the other expenses are the same in both cases.

The public, however, think favorably of a railway having mere passengers to carry, and otherwise of one having what they term heavy transportation to do (11). This proceeds from not duly considering the above fact, nor rightly estimating the relative wear and tear and compensation in the two cases, and forgetting that that only is heavy, which is disproportioned to the power that sustains it.

Thus it is really true, however paradoxical it may seem to some, that 10 to 15 trains carrying low and compact loads over a road always level, at a speed of only 9 to 10 miles per hour, the weight of car, and locomotive being in the proportion to the power of rail, as $1\frac{1}{2}$ and 2 is to 10, and having always full loads and full compensation, are less injurious to both road and machinery, and are more profitable, than half that number of passenger cars, going over it with a lurching and vibratory motion at 20 to 25 miles per hour with equal pressure on the rail, and carrying irregular loads with irregular compensation. Hence it is, that all the railroads and canals in England passing through mineral districts, are at very high premiums, and why should it not be so here, under circumstances the most favorable to produce it?

That the road should be three to four times longer than any yet used for a similar purpose, is often asserted as being a bar to its profitability, in this particular article of coal (6). But such arguments will not hold with the reasonable, and as in all other respects its length (12 and 32) is admitted to be the most profitable, as being a fair daily run for a locomotive, having a long range for way travel, generally furnishing half the receipts from this item (36); so will it prove, in the carriage of coal, and this difficulty with some others raised by disturbed fancies, be found only imaginary.

6th. The unity (41) of connexion between these terminations, which is defined by a clear and unbroken passage between them, obtains here completely, as the coal will be loaded into the cars at the mines, and will not be disturbed until it is emptied into the holds

of the vessels, or into the depot on the Delaware, where there will be 2,000 feet of wharves capable of discharging over a million of tons annually; and the depot, when necessary, will hold 300,000, and will be approached by six tracks or sidings of a mile each, capable of accommodating 20 descending loaded trains, and 20 ascending empty trains of 50 cars each; and admitting at the same time a free passage for the locomotives either way at all times. The city consumption of coal will, of course, be brought down as wanted, and deposited either along Broad street, or into barges, for delivery along the city front on the Delaware. It now amounts per annum to about 130,000 tons of red and white ash, or about 400 tons per day, equal to about two trains only.

7th. The competition which this road would have to encounter was not overlooked, and its ability to carry cheaper, under such favorable circumstances as to grades, than the Schuylkill canal, was satisfactorily proven to its projectors, before it was undertaken; and since the many improvements which have taken place in every branch of the railway, have materially increased that ability; and which we will illustrate by the following comparative statements of costs by each, taken from practice and experience and not from theory.

It should be noted that it is from the Schuylkill region alone that Philadelphia, and the markets east of it, can be supplied with red ash coal, which comprizes the bulk of the consumption, and commands 1 to \$1½ per ton higher than the other kinds of Anthracite, which it can also furnish to any extent, and there can be no doubt that this region will be in the position hereafter, greatly to extend its business in general, and its coal trade in particular (29).

By the Schuylkill navigation. The cost of freight (24), on an average of five years the duration of a boat, would be scarcely covered, and few capitalists would invest even under a guarantee of this rate for the whole term of duration, including unloading boat (in 1840 opened at 80 ct. and closed at \$1⁹⁵/₁₀₀) - - - - - 1 12½

Labor of shipping, screening, wharves and piling, ¼th in Philadelphia - - - - - 20

Wharf rent estimated at \$500 instead of \$1500 per annum, clerk hire, screens, wheelbarrows, etc. - - - 10

Carried forward, 1 42½

	<i>Brought forward,</i>	142½
Wastage on the canal* (23) 2 per cent (when freight is liable for any excess beyond that rate) and loss in handling on wharf in Philadelphia, at 3 per cent., or together 5 per cent	- - - - -	25
Rent of Pottsville landings, labor and waste there in passing over screens	- - - - -	12½
Cost of shipping on the Schuylkill, exclusive of toll on the canal†	- - - - -	1 80
Gain to the trade by the substitution of the railroad cars, in place of boats and lateral road car as now used,	- 25	
Advantage of loading on the Delaware, and additional price per ton given in New York, market for coal broken at the mines and loaded over screens <i>into barges</i> on the Delaware, over that for coal shipped as usual <i>in vessels</i> from the Schuylkill at Philadelphia, say at least	- 15 40	
		<hr/> \$2 20
By the Philadelphia and Pottsville railway the ascertained cost for use of cars (4) is per ton, cents 27 ; for use of motive <i>power</i> per ton, cents 23—50 (5). Thus a "locomotive and train of fifty cars" will cost on this road \$9,000 to \$10,000 per annum, and allowing her to make only one hundred trips of 188 miles each in 365 days, and to deliver in all as a medium 20,000 tons per annum of downward freight only, or returning empty, will give 45 to 50 cts. per ton, and they will be enabled to charge‡	- - - - -	\$2
Difference in favor of railway,	- - - - -	<hr/> \$20 cts

* The canal is too narrow for the ascending, and too shallow for the descending trade. In the one case the boat jams, in the other it grounds, and long detentions are the consequence. No enlargement of the locks can ever make it a dangerous competitor of the railway.

† Single instances of shipment may be cited, as showing some saving on these rates per canal, but on an average of years they will rather be higher, than under our estimate, and prior to the wastage and cost of some other of the items being better regulated, the Board of Trade of Pottsville made the cost of shipping into vessels on the Schuylkill, without toll, \$2 08 to \$2 31 per ton per their report. This instability as to cost, is one of the worst features on the canal, where the dealer must ever be at the mercy of the freighter, or own his own boats in self defence.

‡ These rates were calculated at first from the experience on inferior roads, and have accordingly, by the results obtained on the road itself, been found full high. The Pottsville Board of Trade, in both their reports for 1840 and 1841, corroborate these estimates of cost on the railway.

Being twenty cents (and which cannot vary five cents either way) in favor of the railway, which will be about fairly remunerated at \$2 per ton, besides economising \$1 per ton for the consumer, or rather over the present toll on the canal.

But in order still further to economise the cost of transportation to New York, over the old mode of shipping from the Schuylkill at Philadelphia, a plan has lately been resorted to, with success, of shipping the coal by the small boats of 50 tons directly through, from Pottsville to New York by the Delaware and Raritan canal, as a temporary shift, until the completion of the railway should enable them to load on the Delaware into the larger barges of 200 tons, fitted with Erricsson's Propellers (37), if found cheaper than towage, and by the same route carry it in 45 hours, by steam power through to New York from the mines.

The following is a comparative statement of the costs by the mode of shipment which now obtains, and that which will be practised on the completion of the railway to the Delaware.

By the Schuylkill Canal, and Delaware and Raritan Canal in 54 ton boats.

<i>Freight.</i> —Opened in 1840 at \$1.90 and closed at \$2.90 per ton, average for season, (476 miles, 262 locks),	\$2 15
<i>Toll.</i> —To the Schuylkill canal	90
<i>Toll.</i> —And steam and horse towage to Delaware and Raritan canal, 260 miles to and from Fairmount,	60—3 65

By the Philadelphia and Pottsville Railway and Delaware and Raritan Canal, in 200 ton barges.

<i>Freight,</i> estimated thus, 200 ton barge, cost \$3,300, making one trip per week*, and allowing her to last 11 years, say \$300 per annum or per trip,	8 75
<i>Carried forward,</i>	3 65

* To and fro	66 hours.
Loading	12 "
Unloading	66 "

24)144

6 days per trip.

	<i>Brought forward,</i>	8 75	3 65
Interest on capital, say \$300 per annum, or per trip,	- - - - -	8 75	
Working boat, including victualling as now paid, \$65 per month, or per trip	- - - - -	16 25	
Towage on the canal, (horse power, \$25 to and fro, or per ton 12½ cts.	- - - - -	25	
Incidentals, wharfage, towlines, etc., \$10 per month, per trip,	- - - - -	2 50	
Unloading boat, 200 tons, at 9 cts. per ton,	- - - - -	18 75	
Distance to and fro 230 ms., 28 locks, 200 tons,		\$80	—40

Toll.—To Delaware and Raritan Canal ¼ ct. per ton per mile, 43 miles, as now charged, and as greater facility will also be given for shipping coastwise, this rate could not be increased, say - - - - - 25

Towage.—Allowing tow boats to cost \$80 to \$100 per trip of 144 miles, to and fro, the fuel being cheaper, and to be able to deliver 6 to 8 barges, or 12 to 1600 tons per trip, (the horse towage on the canal 12½ cents charged to freight,) and the river towage would pay, at per ton, - - - - - 10

75

Railroad.—Delivering on the Delaware, 94 ms., enabled to charge \$2 per ton, but to meet close competition at first, say - - - - - \$1 50 —2 25

Difference in favor of the Railway and Delaware route, - - - - - \$1 40

As now conducted the boats are ill suited to New York Bay, and the wear and tear must be considerable. The saving by this direct route over shipping at Philadelphia on the Schuylkill, is \$1 per ton, and when prepared for delivery to the consumer from the boat, the saving is one dollar more, or in all \$2 per ton.

On the Railroad and Delaware, to and from New York, the boat makes four trips per month, goes each 230 miles, and passes 28 locks, 40 cents per ton on 200 tons each, for four trips, - - - - - 320 00

Carried forward,

	<i>Brought forward,</i>	320 00
On the Schuylkill to and from New York, the boat makes		
two trips per month, goes each 476 miles, and passes		
262 locks, \$2 15 per ton, or on 54 tons each for two		
trips, - - - - -		
		\$232 20
<hr/>		
Additional earning by <i>Railway and Delaware route</i> pr month		\$87 80

Thus, in either way, is the Railway and Delaware route the cheapest and most convenient. And besides there are these further advantages in favor of it. 1st. A quicker and more certain delivery. 2d. A steadiness in its charges. 3d. A facility of business and personal intercourse. 4th. An avoidance of any wasteful accumulation of stocks. 5th. A saving in capital and interest, and as a consequence of all these new facilities, and the additional security they give to the trade, more banking accommodation will doubtless be extended to it, than it has ever yet enjoyed. These items cannot exactly be stated in figures, yet it must be evident they will be of considerable pecuniary saving to the operator in a cash article, whose profits are estimated in cents. The uncertainty as to weight, which cannot be entirely corrected, but above all the fluctuations in freights on the canal, varying during a season more than a dollar per ton, must defy all certain calculations. On the railroad there are **NO SEASONS**, and the supply can always be regulated to suit the demand the year through: it must indeed come to this, as the time is gone by, when money can be borrowed to beat down competition and to make fictitious dividends.

A work which is thus to bring so many advantages to the Schuylkill region, should have in return its sympathy and *hearty co-operation*; as even down to the hardy miner at his dreary task, will he find it lightened in the reflection, that the gay pleasures and busy hum of the metropolis, have thus as it were, been brought to the mouth of his pit, and that he may then partake of them at small cost and little loss of time. His more generous soul will repay such good, with a swell as natural and as ample as his own dear mountains; and instead of gladdening over an occasional interruption as the failure of the whole scheme (39), he will rather aid and glory in its success, feeling as he will moreover, that every dollar earned to the road by his labor and exertion, will be one also at least, gained to the region.

8th. We will now put on record our estimate of a year's busi-

ness (16) on this road, with *one track and competent turn outs*, and with the requisite number of cars and locomotives to do the business we have allotted to it. The road to Reading, about 60 miles, has now been in operation upwards of a year, and the comparative costs of transportation, as given in No. 7, are the facts, corroborated by their own experience. The road, therefore, when finished, can *command a preference*, and making our charges of fare, toll and freight at the average rates, we will say that there passes over it in one year,

500,000 tons merchandize and coal, up and down, at an average of \$1 $\frac{1}{2}$ nett, per ton, - - - - -	\$750,000
50,000, through passengers, 68 each way daily, at an average of \$2 nett each, - - - - -	100,000
—— the mail, carried 100 miles, - - - - -	25,000

In order that the amount of receipts on coal and merchandize may not startle the reader, he must bear in mind that this company are *freighters as well as toll receivers*, and also the fact that the amount paid on a season's business on the canal in toll, freight, wastage, handling, etc., averages the enormous sum of 1,300,000 to \$1,500,000, which we thus contrast to show the comparative economy of the railroad, and the urgent necessity for it, in the face of the increasing use in New York of foreign coals, by the low prices at which they are sold, and the impending reduction of the duty on them, which is now \$1 $\frac{1}{2}$ per ton, and will be down in 1842 to \$1 $\frac{1}{4}$ per ton, when the advalorem duty of 20 875,000 per cent. should be levied on at least \$9 per ton. And if the canal, doing business only *eight months* in the year as merely toll receiver, has been competent, at an expense for maintenance of \$1,200 per mile per annum, to receive near \$600,000, can the competency of the railway to receive \$875,000 from *toll, freight, passage money* and the *mail*, be doubted, doing business *twelve months* in the year, at an expense of \$1000 per mile per annum for maintenance,

DISTRIBUTED ON THE FOLLOWING TRUE PRINCIPLE.

Interest Account.

One loan, 1,000,000, 5 per cent.,	-	50,000
One loan, 1,500,000, 6 per cent.,	-	90,000—140,000

Road Fund.

Adjustment, renewals, etc.,	-	-	\$703
Management, salaries, etc.,	-	-	100
Contingencies, etc.,	-	-	197
\$1000 per mile per annum,	-	-	—100,000

General Charges.

Extra motive power, superintendence, etc., \$250 per mile per annum,	-	25,000
---	---	--------

Sinking Fund.

For extinguishment of loans, effected at this rate in 8 to 9 years,	-	-	210,000
			<hr/> 475,000

Dividend Account.

On capital, \$2,500,000, at 16 per ct. per annum,	-	-	-	-	.400,000—\$875,000
--	---	---	---	---	--------------------

This cost of five million is *sufficiently accurate*, and includes 6 to \$700,000 for machinery, etc. The proportion of loans and capital may hereafter vary from the above somewhat, some of the bonds issued by the company being convertible. It may be that the capital will ultimately be three millions and the loans two millions; and this cost, in reference to the *quality* of the work and the *results* to be produced by it, fully entitles this road to be called the *cheapest in the world*(42). It is often *senselessly asserted* that this work will cost *too much*, but those who will *really examine* its *character* and *purposes*, and are aware of the importance of true economy on a railway, will find how unfounded is such a charge; and how truly that feature will appear throughout the work and accord with this correct definition of it: "Mere parsimony is not economy. Expense, and *great expense*, may be an essential part in true economy. Economy

"is a distributive virtue and consists not in saving but in selection." Any addition to the cost of machinery will be desirable, as the result of increased business; each "*locomotive and train of fifty cars*" would cost together \$20,000, and according to our estimates would earn annually at least that amount of nett freight. Much system and discipline even now obtains on this road, and is a guarantee for the future of its being equal to any amount of business, if aided by the necessary appliances.

9th. The summary then is, that the adequate structure of this road, its perfect adjustment, the level character of its grades, and the clear and unbroken passage for the delivery of the *even now* enormous trade between its terminations, will enable the modern locomotive, for the first time to display effectually its immense power, and the consequent cheapness of that power when thus applied with regularity, and on a large scale; a principle fully exemplified on the natural highway of the Hudson river, between Albany and New York, where flour is carried very profitably 150 miles for 12½ cents per barrel, freight and towage. And as regards *travel* at least, will they attempt to rival in New York the cheapness of this great natural avenue by a railway (30) ?

And having now fully considered this road as to its capacity and position for doing a large transportation business, we may add, that in regard to travel (10), although now of a secondary character, it is likely to be considerable even from Pottsville, and that when the contemplated connections now in progress and partly finished, are made with that place, it will become a great *thoroughfare*, as must be seen by those who will consult the map. The fact that from Elmira, (at which place a connection will be formed with the New York and Erie railroad,) it is some 30 miles nearer to Philadelphia, than from that point to New York, will cause much of the travel to pass through the valley of the Schuylkill (15).

10th. In the nine preceding articles we have aimed at nothing but the truth, and believe firmly that in the *main* we have given it, having sought to build our positions, not on mere argument and theory, but on the data of fact and experience, which is now in abundance around us, and to which we would desire to call the attention of the candid and disinterested inquirer, in the hope of gaining his support to this safe and useful species of improvement (33), which is beginning to be viewed, the world over, as a great instrument of beneficence and civilization, and in our wide spread country it is

our surest bond of union (38); and therefore deserves at the hand of every true patriot, together with its great coadjutor, the steamboat on the water, to be held up to general patronage and favor, which makes it not only obligatory to impart, but to seek the truth in respect to it. Every steamboat, every railway, all facilities of intercourse, are but so many bounties offered to skill and intelligence.

It is to England we must look for great results; where, for instance, the transportation of coal and iron alone are some 26,000,000 of tons per annum, as compared with only 1,000,000 in this country; the one compressed into a small compass, the other spread over a large one.

The canal system in England had fully established itself long before extended lines of railway were thought of; but the latter have now so far the supremacy, that wherever there may be a question of an improvement (18) it has a preference, to which its claims are in this country even stronger, from the interruption to our canals in winter, which rarely happens in England. It is the certain destroyer of all monopolies. In short the whole world has become impatient of the sluggish and comparatively uncertain nature of canal transportation; and wherever steam power can be substituted, it is done, particularly in situations such as we have been considering, where it can be applied on the true principle of economy and profit; that is, with *regularity*, and on a *large scale*, and the *fuel* is taken at its fountain head.

But this subject cannot be fully understood without going into an examination of the causes which have prevented our leading lines of railway, from rising more into public favor. It was natural that the test of their success should be looked for here.

1st. That between New York and Philadelphia is encumbered with a capital of near \$9,000,000, when a little over a third of that sum would construct a more efficient communication than now obtains between the two cities.

2d. That between Baltimore and Philadelphia, had to buy up its competitor on the river, at near a million of additional cost, upon an already costly road.

3d. That between Baltimore and Washington, and the Ohio, have also been overlaid with heavy expense, from original defective *construction*.

4th. The Columbia railway, from Philadelphia, in like manner, ultimately doubled its original estimated cost, being designed at first for *horse power* : and its management has heretofore been always subservient to politics (35) with the rest of the Pennsylvania works.

All these improvements particularly (8), have also been the victims attendant on being the pioneers in this useful means of intercourse, and much allowance should be made for them. And further, the Washington and Baltimore railroad is taxed (26) in 20 per cent. of its receipts by the State, instead of receiving a bounty, as all railways deserve for the imperceptible, but immense collateral advantages they render the community (31). Yet in the face of so many drawbacks, these improvements have been shown by our late monetary convulsions to be among the most sure and profitable of investments, and but for those drawbacks, would have been the most prominent. The time is now coming, however, when the mists of humbug and speculation will be cleared off, and the public be enabled to see, that the causes which have heretofore operated either to diminish, or entirely to frustrate the success of railroads, are wholly extraneous to them, and that as now conducted, with the experience gained in their management, and conforming to the principle of being judiciously constructed between desirable points, they must ere long, need only to be known to possess these qualities, to become favorite investments, both for their direct and collateral advantages (13).

On these grounds, then, we ask the reader to turn to the Philadelphia and Pottsville railroad, in all its completeness, having on it the stamp of the latest improvements, and open in its second track to those which are to come.

And considering further, that it is only taxed in eight per cent. on its dividends, and having the GUARANTEE OF NATURE and its own immense power against future rivalry and opposition, pronounce openly and aloud what truth must require of you to believe of its prospect for profit and usefulness, as compared with any of its contemporaries, which, with all their drawbacks, are found to be among our best investments.

Our title has been taken from Mr. McLane's last report on the Baltimore and Ohio railroad, which has been completely resuscitated by his talent and industry ; and in speaking of the success of the Washington branch, as the only finished work of the company's, he says, it " fully realizes any reasonable expectations that may be

entertained from railroads judiciously constructed between desirable points."

In further corroboration of this remark, we add a list of several paying roads, premising that most of them have only the one advantage of connecting desirable points, yet they show enough fully to establish Mr. McLane's position; and it may be re-asserted with every confidence that roads, agreeing with this description, as does the Philadelphia and Pottsville in the broadest sense, offer a security equal to real estate, the light in which this property is viewed in England, and which will generally yield a better income, as having more of the seeds of improvement in it.

Camden and Amboy railroad dividend, 6 to 7 per cent. per annum.

Baltimore and Ohio,	do	do	4	"	"
Boston and Worcester,	do	do	6	"	7
Boston and Providence,	do	do	7	"	8
Georgia Central,	do	do	8	"	9
Schenectada and Utica,	do	do	12	"	13
Champlain and St. Law'n.,	do	do	10	"	"
Baltimore and Philadelphia,	do	do	6	"	7
Baltimore and Washington,	do	do	7	"	"
Charleston and Augusta,	do	do	7	"	8
Boston and Lowell,	do	do	8	"	9
Mohawk and Hudson,	do	do	6	"	7
Mine Hill, [Coal,]	do	do	11	"	12
Utica and Syracuse,	do	do	9	"	10

To which we will also add the latest market prices of some of the leading railways of England, where their more abundant means have enabled them to construct their roads more substantially than we could generally afford to do, but in the inventive part, they owe the edge and bridge rail to American engineers; and in motive power they have made nothing as yet so good as the American locomotive, and which they have the liberality to use, much to the scandal of their own mechanics. England is extending her railways on all sides, and the continent is also moving actively in them.

Stockton and Darlington coal railway,	at	£275 for £100 paid.
Grand Junction,	- - - -	215 for do.
Liverpool and Manchester,	- - - -	187 for do.
London and Birmingham,	- - - -	179 for do.
Great Western,	- - - -	92 for 66

York and Midland,	-	-	-	-	-	£67 for	£57 paid.
North Union,	-	-	-	-	-	83 for	75 do.
London and Southampton,	-	-	-	-	-	58 for	30 do.

Their dividends are from 8 to 10 per cent. per annum, being generally restricted to the latter rate.

And we will here venture the prediction that in the course of the next five years, every one of the above American roads will pay regular dividends of 10 to 15 per cent., and that as regards the Pottsville and Philadelphia railroad, being of solid structure, free from unproductive cost, over which heavy loads can be drawn with light engines at ten miles per hour, fed with fuel, which is more than half the item of motive power, at the lowest rate, connecting at one end with mines, from which a million of tons are now required to be discharged, and having at the other end every facility for the speedy venting it in every direction, and in all classes of vessels, and above all, being without competition at \$2 per ton, this railway we say carries in and about it, more of the elements of success, than can any where else be presented, and that therefore its superior power and economy will always have full and profitable occupation, in the immense business and travel that now exists, and will be constantly accumulating from its own creative quality.

There is now a prospect of this road being completed to Pottsville in the course of the year 1841, when its usefulness will not remain long *unfelt*, and the admission consequently made, that in thus bringing the coal and iron mines, as it were, to the door of Philadelphia, from which she can no more be cut off by flood or frost, the prosperity and comfort of her citizens will have been placed on the most solid basis ; and they may then also be induced to entertain a pride in possessing the most efficient and best specimen of the railway, and delight to boast of it. Common cause must also be made by all the eastern seaboard, dependent on Pennsylvania for their coal and iron, in effecting by means of it the utmost reduction and the least fluctuation in the prices of these all-important articles, which, in fact, must be the natural result of this railway, unless the experience every where else, in the effect of steam power, even under *less favorable* circumstances, is found in this case to be nugatory (16). And it remains, finally, for the philanthropist and man of charity to indicate, by what other means good can be elicited of a nature more positive or more broadcast (27).

Our account of the Philadelphia and Pottsville railway would not be complete without reverting to the date of its origin. It obtained its charter in 1833, and was commenced in 1835. At that time it was deemed peculiarly rash to attempt competition with a canal for heavy freight (18) ; but it was here seen that the feature of descent on this line, which was a *difficulty* to the navigation in multiplying its locks, was a *facility* to a railway in giving it the aid of gravity, the cheapest of all auxiliaries of motive power ; and in superadding to it a superior construction of road generally, although entailing the seeming reproach of extravagance, an *effect and economy* were imparted to it, which will result, as we have already stated, in the greatest advantage to its projectors as well as to the public. Scarcely had it made any progress, when the monetary troubles of the country commenced in 1837, prostrating both private and public credit ; and subsequently it has had to contend as well against the agitation of war as against every discouragement which a powerful and hostile interest could throw in its way. But this jealousy will seem natural enough to the disinterested, who must perceive in this work a cheaper substitute for so many others having the same object, of supplying the coal demand, or of seeking the most central point for travel at Harrisburgh on the Susquehanna ; and with which they must be more particularly struck by reference to the map.

To those therefore who understand the power of interest in transforming the judgment, it will be no longer matter of wonder that the claims and merits of a *more powerful and genuine* rival, should be disregarded or find so little favor. But truth will at last prevail, and justice be done to the enlightened perseverance of the President of the Philadelphia and Pottsville railway, Elihu Chauncey, Esq., and to a few other determined advocates, who were not to be deterred from showing up the irresistible evidence of experience in its favor, as well in this country as in England, and thus to break the torrent of interest and prejudice that would unwittingly have swept it away (34).

SUMMARY OF CONTENTS.

INTRODUCTION

Shows that there is a feeling of necessity with the public for railways, but that they are generally mistrusted as safe and profitable investments.

That railway investments on private account are the largest, notwithstanding, in the United States, and are extending in every direction.

SKETCH

Shows, that canals are more costly to maintain while in operation than a good railway. The latter far less liable to extraordinary demands, and are more readily repaired than canals.

That great improvements have been made in the last few years in the locomotive, and that it is still progressive, with all the other machinery of the railway. •

That the relative strength of the rail to the weight of the load on it, determines whether the transportation be *heavy or not*, and this being rightly adjusted, the railway becomes as suitable for freight as for passengers.

That no sufficient reason can be shown, why coal cannot be carried over a level railway in cars with springs 100 miles or more, without any material waste.

That the best structure of a railway for our northern latitudes, is that which can be easiest adjusted when deranged by the frost, and *at all times* when the traffic is passing over it, and which should be attended to without stint of cost as the basis of all economy.

That the wear of the rail, by results here and in England, is scarcely any thing, and the occasional tearing of it by the locomotive is hardly an item.

That the several items composing the cost of perpetuating a rail-

way amount to \$703, and the fairest mode of supplying the road fund to meet that object is also shown.

That railways are looked upon in England as investments in the soil, or as real estate in point of security, and that they are so in point of fact, with the further advantage of being less troublesome and freer from taxation, besides their immense collateral advantages to the community.

That a unity of connection in the terminations of a railway with only one set of machinery for the whole line is all essential to economy.

That the fitness of the terminations is determined by the sufficiency of business between them to justify the construction of the railway, and that long lines, with abundance of way travel, are the most profitable, 100 miles being a happy medium as not overtaxing the locomotive in a daily work.

That the carriage of general freight, even at a higher toll on a railway, is cheaper than by a canal, by reason of the time gained on it. That economy of time is the desideratum of the age as the groundwork of success in any pursuit.

That coal is peculiarly well adapted for transportation on a railway, and on the one referred to can be done at a *cheaper* rate than any of the canals in competition with it.

That *freight trains* at *slow* velocities cause less wear and tear than *passenger trains* at *high* velocities, and in mineral districts, pay better, because of the load and consequently the compensation, being *more regular*.

That an uninterrupted intercourse the year through by a railway with a mineral region, is of the utmost importance to it and to the public, by extending the trade and cheapening the price of articles, that enter so largely into the wants of the community.

That a single track railway with suitable turn outs, is capable of doing an *immense* business per annum: its great profitableness on the railway in question, and shows the true mode of distributing its earnings.

That the utmost economy of steam power is only attained, when its application can be made on a *large* scale and with *regularity*, as in the case cited.

That the valley of the Schuylkill is destined to be a great thoroughfare of travel, which would be much promoted by connecting at Corning or Elmira with the New York and Erie road, to intercept the Lake trade.

That railways should be encouraged for their beneficent effects.

and as being the *best defence* against the enemy, and the *surest bond* of the union of the States.

That railways, such as our main lines, are much lowered in general estimation by the *many causes* which subtract from their profitability, and which are supposed to be in the roads themselves, when in fact they are altogether *extraneous* to them.

That it is opposed to an enlightened policy to tax railways, when the very foundations of a State, lie in the quick and cheap circulation of the people, and of the fruits of their labor, as well as of the thousand wants necessary to their comfort and subsistence.

That railways *rightly located* are profitable, whether in this country or in England, dividing, as per lists exhibited, from 6 to 12 per cent. per annum, and that they must be a constantly improving interest with the onward progress of the community that feeds them.

That no other railway in this country at least, has the same elements of success in and about it as the Philadelphia and Pottsville railway, and that it cannot be interfered with by competition.

That, according to the testimony of Louis McLane, Esq., President of the Baltimore and Ohio Railroad, "a railway judiciously constructed, between desirable points, will realize all that should reasonably be expected from it."

APPENDIX

Contains authentic statistics and facts confirmatory of the *positions* assumed in the Sketch.

A P P E N D I X .

To offer mere assertions on the subject of railways, in the present state of public feeling towards them, would assist but little in spreading the belief in the fact, now well established in this country and in England, that when "judiciously constructed between desirable points," they will realize every reasonable expectation of profit and security.

It is, therefore, that we have appended the following evidence, taken from actual practice, and which we think, with every candid inquirer, will be fully confirmatory of the above important truth.

And in setting up the Philadelphia and Pottsville railway as a model and as unique of its species, we confess our desire is to make the public better acquainted with a work of real merit, and *not merely of local interest*; and through the data derived from its level character, to afford them the best ground work for judging *relatively of every other railway*.

No. 1.

As communications by railway are now being established every where, it may be as well to examine who were the originators of it in this country, where it has been the most widely extended.

In Niles' Register, for 1812, we find a communication from Oliver Evans, of Philadelphia, on steam engines, and to which is appended the following certificate, which goes to show that he must have been among the first to entertain the idea that steam power could be usefully applied to land carriages:—

"I certify that Oliver Evans did, about the year 1789, communicate a project to me of propelling land carriages by power of steam, and did solicit me to join him in the cost and profits of the same."

Signed,

LEVI HOLLINGSWORTH,

Baltimore, Nov. 16th, 1812.

In the same year, 1812, Col. John Stevens put forth a pamphlet, entitled "Documents tending to prove the superior advantages of Railways and Steam Carriages over Canal Navigation," and among which is a memorial from him to the Commissioners, for exploring the route of an inland navigation, Messrs. D. Clinton, G. Morris, and R. L. Livingston, the object of which was to propose a wooden railway, on which a steam engine should propel, by a force equal to the competent number of horses, one hundred tons, at the rate of ten miles per hour.

This proposition was rejected by them, and the project of the Erie Canal adopted, which was not to be wondered at, considering the then flourishing state of the canal system in England, and that no trial of the railway with steam had yet been made.

Col. Stevens was not, however, discouraged by this rejection of his proposal, and remarks, that "he felt no doubt of the final success of the project. The very objections of the Commissioners serve only to increase, if possible, my confidence in the superiority of the proposed railways over canals."

The system of railways began again to be seriously agitated about the year 1825, and it must have been a gratification to Col. Stevens that he lived to see it fully carried out by his son, Robt. L. Stevens. He died March 6th, 1838, aged 88.

No. 2

Since the opening of the road the following are some of the trial loads, which have passed over it at an average speed of 12 miles per hour, Anthracite coal being used, and the engines weighing about eleven tons. This lightness of engine, doing so heavy a business, being one of the profitable features of this road.

	No. Cars.	Bbls. Flour.	Tons Iron, &c.	Tons, nett load freight.
1839. 8 wheel Engines.				
Dec. 30, Gowan & Marx, by Eastwick & Harrison,	69	1001	55	155
1840.				
Jan. 8, Gowan & Marx, by Eastwick & Harrison,	57	1573	66	213
" 15, Minerva, Wm. Norris,	85	1237	72	216

A P P E N D I X .

To offer mere assertions on the subject of railways, in the present state of public feeling towards them, would assist but little in spreading the belief in the fact, now well established in this country and in England, that when "judiciously constructed between desirable points," they will realize every reasonable expectation of profit and security.

It is, therefore, that we have appended the following evidence, taken from actual practice, and which we think, with every candid inquirer, will be fully confirmatory of the above important truth.

And in setting up the Philadelphia and Pottsville railway as a model and as unique of its species, we confess our desire is to make the public better acquainted with a work of real merit, and *not merely of local interest*; and through the data derived from its level character, to afford them the best ground work for judging *relatively of every other railway*.

No. 1.

As communications by railway are now being established every where, it may be as well to examine who were the originators of it in this country, where it has been the most widely extended.

In Niles' Register, for 1812, we find a communication from Oliver Evans, of Philadelphia, on steam engines, and to which is appended the following certificate, which goes to show that he must have been among the first to entertain the idea that steam power *could be usefully applied to land carriages*:—

"I certify that Oliver Evans did, about the year 1789, communicate a project to me of propelling land carriages by power of steam, and did solicit me to join him in the cost and profits of the same."

Signed, LEVI HOLLINGSWORTH,
Baltimore, Nov. 16th, 1812.

In the same year, 1812, Col. John Stevens put forth a pamphlet, entitled "Documents tending to prove the superior advantages of Railways and Steam Carriages over Canal Navigation," and among which is a memorial from him to the Commissioners, for exploring the route of an inland navigation, Messrs. D. Clinton, G. Morris, and R. L. Livingston, the object of which was to propose a wooden railway, on which a steam engine should propel, by a force equal to the competent number of horses, one hundred tons, at the rate of ten miles per hour.

This proposition was rejected by them, and the project of the Erie Canal adopted, which was not to be wondered at, considering the then flourishing state of the canal system in England, and that no trial of the railway with steam had yet been made.

Col. Stevens was not, however, discouraged by this rejection of his proposal, and remarks, that "he felt no doubt of the final success of the project. The very objections of the Commissioners serve only to increase, if possible, my confidence in the superiority of the proposed railways over canals."

The system of railways began again to be seriously agitated about the year 1825, and it must have been a gratification to Col. Stevens that he lived to see it fully carried out by his son, Robt. L. Stevens. He died March 6th, 1838, aged 88.

No. 2

Since the opening of the road the following are some of the trial loads, which have passed over it at an average speed of 12 miles per hour, Anthracite coal being used, and the engines weighing about eleven tons. This lightness of engine, doing so heavy a business, being one of the profitable features of this road.

	No. Cars.	Bbls. Flour.	Tons Iron, &c.	Tons, nett load freight.
1839. 8 wheel Engines.				
Dec. 30, Gowan & Marx, by Eastwick & Harrison,	69	1001	55	155
1840.				
Jan. 8, Gowan & Marx, by Eastwick & Harrison,	57	1573	66	213
" 15, Minerva, Wm. Norris,	85	1237	72	216

1839. 8 wheel Engines					No. Cars.	Bbls. Flour.	Tons Iron &c.	Tons, nett load freight.
Jan. 23,	Gowan & Marx,	by	Eastwick & Harrison,		85	1553	84	238
Feb. 5,	do.	do.	do.	do.	72	1758	11	187
" 20,	do.	do.	do.	do.	101	2002	78	268
6 wheel Engines.								
March 6,	Hitchins & Harrison,	Baldwin & Co.,			88	1598	70	228
1841.								
Feb. 5,	do.	do.	do.	do.	102	1479	104	251
" 9,	do.	do.	do.	do.	105	1318	177	308

The coal trains will average 50 to 60 cars of $3\frac{1}{2}$ to 4 tons load each. The trip to and from the Mines will occupy two days, the nett load of downward freight delivered being about 200 tons, no allowance being made for back freight, of which the engine would be capable of taking 100 tons. The expense of *locomotive and train of 50 cars* cannot average over \$90 per trip of 188 miles, and she will be enabled to make, without difficulty, 100 to 125 trips per annum, at a total cost of nine to ten thousand dollars.

The following, shows with sufficient precision the items composing the expense of running a "*locomotive and train of fifty cars*" on this road per day. Its advantages as to fuel, a principle item, should be noted as *unequalled*; on most other roads this item would be doubled for the same distance;—

Two and a half tons of coal, say for 100 miles, at an average of \$2 $\frac{1}{2}$ per ton, (at the Mines it could be had at \$1 $\frac{1}{2}$ per ton,) - - - - -	\$6 25
Engineers pay per day, - - - - -	2 00
Fireman's pay per day, - - - - -	1 50
Oil, one gallon, - - - - -	1 00
Repairs of engine, say per day, on a cost of \$8,000, - - - - -	6 75
Per day, - - - - -	<u>\$17 50</u>

Expense of a car per day or for a run of 100 miles, cost of coal car about \$250.

Proportion of attendance, one man to 10 cars, \$1 25 per day, per car - - - - -	12 $\frac{1}{2}$
Oil, $\frac{3}{4}$ of a pint, at 90 cents per gallon, (much less if lard is used,) - - - - -	9 $\frac{1}{2}$
Repairs to a coal car per day, - - - - -	30
Per day - - - - -	<u>52</u>

(37)

The daily expense of a locomotive being \$17 50 for two days, or per trip,	- - - - -	\$35 00
The daily expense of a car being 52 cents for two days, per trip \$1 04, and on train of 50 cars,	- - - - -	52 00
		<hr/> \$87 00 <hr/>

Say \$87 estimated expense of "*locomotive and train of 50 cars*" per trip of 188 miles, or two days on Philadelphia and Pottsville railroad. These of course are the mere expenses incidental to transportation, and are equal to about 50 cents per ton, all over that charge, say that \$2 per ton on coal is the rate, then there would be \$1½ per ton, to pay repairs and renewal of road, interest on loans, etc., and dividends or nett profits.

No. 3.

One of Baldwin & Co.'s small class engines of 9 tons, the Never-sink, drew up the road 52 loaded cars, gross 230 tons, nett load of freight 153½ tons, at a speed of 11 miles per hour, so that besides taking back the empty cars, weighing about 80 to 90 tons, these small engines can even take a freight up the road of 100 to 150 tons in addition, which is as much, nearly, as can be done on the most favorable roads in this country. The calculations, however, are all based on the cars going back empty.

No. 4.

As regards the expense of greasing the wheels of the cars, (which is thought by some to be such an item,) it has been ascertained by trial on the road, that in using lard on the wheels for eight to nine months in the year, it will not cost over 1½ cents per ton for the whole distance between the Delaware and the coal mines and returning, or for 188 miles. Oil would cost near treble that sum, and has been so charged in the calculations for this road. The price of lard varies from 8 to 9 cents per lb.

No. 5.

It is important to show that the calculations originally made for this road, were not intended merely for effect, but were rather over-charged, as has since been found by experience on the road itself. Thus—

1st. In the use of lard two-thirds of the year, instead of oil, for the car, which will last at least six to eight years instead of only four years, as allowed in the estimate. The experience on other roads and even on the State or Columbia road, where heretofore at least, they have been subject to the roughest usage, justifies the former term of duration, or an average annual wear and tear of $12\frac{1}{2}$ to 15 per cent. in place of 25 per cent.

2d. In the repairs to the locomotive, charged at 25 per cent. per annum, or \$2000 per annum, which allows her to last only four years, while the machines of the present day, doing a daily run of 100 miles, would be warranted by their builders, *on a fair road*, to run 10 years at an average expense of 6 to \$800 per annum; and this will be further substantiated by the following official return of results on roads, varying in quality and circumstances, the speed being 20 to 25 miles per hour with passenger trains.

						cts.
Baldwin, Engines.	5 on Georgia Railroad run	71,824	at a cost of \$5,453	or per mile	7.50	
	12 do. do.	110,540	do. 6,792	do.	6.14	
	8 Utica and Schenectady,	145,860	do. 9,992	do.	6.83	
	6 on Columbia R. R. run	176,732	do. 7,389	do.	4.18	
	3 on Phil. and Balt. run	48,065	do. 523	do.	1.08	
Norris Engines.	2 on Phil. and Balt. run	44,530	do. 787	do.	1.76	
Various manufac- turers.	10 on New Jersey R. R. run	59,033	do. 2,956	do.	5	
	656,634		33,892 average about 5 cts. per mile for <i>high velocities</i> .			

For many reasons, such as peculiar character of the road, etc., etc., this average cannot be of general application, but it may be fairly deduced from it that 4 cts. per mile, on the Philadelphia and Pottsville railroad, *at a low speed of ten miles per hour*, would cover ordinary and extraordinary repairs, and that in doing the annual work, required of her on that road of 18,800 miles, \$800 per annum would keep her perpetually renewed. We have understood from Mr. Norris, that he has offered to those European companies who use his engines, to contract to keep them in running order for 10 years, at an average of \$500 per annum, with his own engine driver, on whom so much depends.

In England the average work obtained from their engines is 20 to 24,000 miles, and the same results are obtained here, but at what *relative expense*, we are unable to say; on the Utica and Schenec-

tada railroad the above eight engines averaged 235 trips of 78 miles each per annum ; and therefore in estimating the performances on the Philadelphia and Pottsville railroad at only 100 trips per annum of 188 miles each, they will not be likely to fall short of that number.

3d. In the loans also, 6 to \$700,000 are included for cost of cars and locomotives, on which full interest is allowed on the estimates for costs of transportation. All the cars and locomotives work in turn on the road, and it is found on roads *well equiped* that 20 to 25 per cent. is a fair allowance for the loss of use among the whole, while repairing in the shop ; thus on the above amount of capital, there will be, at 25 per cent., \$175,000 dead, on which the loss on the whole business of the road will be, at 6 pr ct., \$10,500, chargeable to interest account. This is all that can be lost by the supernumerary machinery, as while in the shop it consumes neither fuel, wages, oil, wear and tear etc.

Thus it should be conceded that the estimates for this road, which are allowed to stand against it in estimating a cost of fifty cents per ton, have been made on the safe side ; and also noted, that the arrangements at either terminus of it are intended to be very complete for the *overhauling and instant repair* of the engines and cars after performing their daily work.

No. 6.

The transportation of coal on a railway, having heretofore in this country been confined to short lateral roads of from 3 to 10 miles, leading from the mines to canals, and its nearness also in England to tide water, not having required railways exceeding 25 to 30 miles, it has absurdly enough been thought impossible to carry it further to any advantage, nor will this notion be entirely cured until it is practically demonstrated on the 94 miles between Pottsville and Philadelphia. Here, for the reasons already given, coal can bear a charge of \$2 per ton, while a passenger, carried the same distance, will pay about $2\frac{1}{2}$ to \$3 ; and as there are at least twenty tons of coal at \$2, for one passenger at $2\frac{1}{2}$, and the *great amount and regularity of load* of coal, enabling it to be transported cheaper, it must be evident, when fitted with two tracks, that such a road would be able to do relatively a more profitable business than one depending principally on the irregular carriage of passengers ; such say, as the following leading roads in England, which are less

powerful and efficient in their grades and machinery, than our road :

London and Birmingham, length of road, 112 miles,	
gross receipts in 1840, - - - -	\$3,612,500
Grand Junction, length of road, 97 miles, gross receipts in 1840, - - - -	2,091,800
Liverpool and Manchester, length of road, 31 miles,	
gross receipts in 1840, - - - -	1,228,700
London and Southampton, length of road, 77 miles,	
gross receipts in 1840, - - - -	1,090,600

Reflect but for a moment on this stupendous social and business circulation, as compared with what it could have been prior to the introduction of the railway, and the consequent addition of wealth and power becomes almost inconceivable in such a hive as England.

Birmingham is the great centre for the mails in England, as Pottsville will be the great centre for the coal trade, the main business of the one is therefore *travel*, as that of the other will be *freight*, and in either country will they be the *distinguished* roads in their respective lines.

No. 7.

The following is a list of sundry private works of internal improvement, with their approximate costs, many of them begotten by this canal mania :

Maryland.

Baltimore and Ohio canal, assisted by State, -	\$10,000,000
Baltimore and Ohio railroad, do. do. -	5,000,000
Baltimore and Washington railroad, - -	1,700,000
Baltimore and Susquehanna railroad, assisted by State, -	3,000,000
Baltimore and Philadelphia railroad, part, \$4,400,000, -	1,600,000
Tide Water canal, part, \$2,800,000, assisted by State, -	1,000,000
	<hr/>
	\$22,300,000
	<hr/>

Delaware.

Baltimore and Philadelphia railroad, part of \$4,400,000, -	\$1,200,000
	<hr/>

Pennsylvania.

Baltimore and Philadelphia railroad, part, \$4,400,000,	\$1,600,000
New Castle and Frenchtown railroad, - - -	600,000
Tide Water canal, part, \$2,800,000, - - -	1,800,000
Delaware and Chesapeake canal, part United States,	1,000,000
Union canal, - - - - -	2,000,000
Schuylkill Navigation, exclusive of boats, cars, wharves, etc., - - - - -	3,700,000
Lehigh canal 73 miles, and 20 miles railroad of 3 in- clined planes, - - - - -	6,000,000
Philadelphia and Pottsville railroad, complete in cars, locomotives, wharves, etc., - - -	5,000,000
Valley and West Philadelphia railroad, - - -	1,000,000
Norristown and Germantown railroad, - - -	800,000
Little Schuylkill railroad, - - -	500,000
Cattawissa and Danville and Pottsville railroad, -	1,500,000
Lancaster and Harrisburgh railroad, - - -	750,000
Harrisburgh and Chambersburg railroad, - - -	1,250,000
Beaver and Cleveland canal, in part, - - -	1,000,000
Williamsport and Elmira railroad, - - -	400,000
Blossburg and Corning or Tioga railroad, - - -	600,000
Port Deposit canal, - - - - -	200,000
Southwark canal, (Del. and Schuylkill abandoned,) -	300,000
Conestoga Navigation, Lancaster to Tide Water canal, - - - - -	300,000
Bald Eagle Navigation, - - - - -	400,000
	<hr/>
	\$30,700,000

New York and New Jersey.

Camden and Amboy railroad, - - -	3,200,000
Delaware and Raritan canal, - - -	2,900,000
Jersey and Trenton railroad, - - -	2,600,000
Patterson railroad, - - - - -	300,000
Somerville railroad, to Elizabethtown, - - -	200,000
Long Island railroad, - - - - -	700,000
Harlem railroad, - - - - -	1,400,000
Sundry Roads from Albany to Buffalo and to Sara- toga, - - - - -	8,000,000
	<hr/>
Carried forward, - - -	\$19,300,000

	<i>Brought forward,</i>	\$19,300,000
Morris canal,	- - - - -	4,300,000
Delaware and Hudson canal,	- - - - -	3,100,000
		<hr/>
New York and New Jersey,	- - - - -	\$26,700,000
Maryland,	- - - - -	22,300,000
Delaware,	- - - - -	1,200,000
Pennsylvania	- - - - -	30,700,000
		<hr/>
		\$80,900,000

This list will serve as a memento of the wasteful expenditure which a facility of borrowing begets, and of the total ignorance, or total disregard of results, with which the major part of these works must have been projected. It is no wonder, therefore, that where so much interest, and consequently of judgment, have been forestalled by this mass of comparative rubbish, that a work of real merit, as well in conception as in execution and design, like the Philadelphia and Pottsville railway, should remain undistinguished; but that this should be so with the unbiased, is only explained by the little consideration they have yet been willing to give to the subject.

It is instructive to look back upon the visionary anticipations indulged in, at the beginning of the anthracite coal trade, as to the annual amount of transportation expected from it, looming into millions of tons, but which, after fifteen years, now only amounts to 870,000 tons per annum: with a constant multiplication of the facilities of getting it to market, the last to enter the lists, the Tide Water canal on the Susquehanna, now proposing to assist in supplying Philadelphia herself with that coal, as well as to supplant her in the supply of the Baltimore market. The counteraction of this and other active competition, therefore, should now render the application of steam power, by a railway leading to Philadelphia from the heart of the coal fields, with laterals embracing every sort of anthracite coal, particularly welcome to her.

The cheaper rate, indeed, at which this railway, shown to be so peculiarly adapted to freighting purposes, will be able to carry it, and its effects, in lowering the tolls on the canal, together with its other economies of detail, must inevitably force a concentration of the bulk of the coal trade, whether by canal or railway, down the valley of the Schuylkill; and we know of no other location in this

country where *both* these avenues will, in consequence, be so soon required to discharge its trade.

Here, then, will the question, which of these two improvements is the cheapest carrier, be put at issue, and on a scale worthy of the cause. So far the public have generally allowed to canals the *undeserved reputation* of being the cheapest, and this has principally obtained, because the State works, in competition with each other, have been compelled to adopt a rate of toll, say one-half to three-quarters of a cent per ton per mile, to which nearly all the private works had to conform, and which, in fact, amounts to sinking their first cost, as measured by the tonnage that is found to pass over them, four to five cents per ton per mile would but cover interest on cost, repairs and maintenance; and thus have railways been made to figure to a disadvantage in the comparison of relative costs of carriage, at a time too, when they were struggling through the difficulties incident to their incipient stage, and which had high overwhelmed them. The great success of those *two monopolies*, the Schuylkill and the New York and Erie canals, were continually adduced as justifying this verdict, but which the railways, running parallel to them, and now in progress, will reverse when they shall be completed and be free to compete with them.

No. 8.

It may be as well to present a view of some of the leading railways, under the circumstances in which it is only fair to judge of their efficiency and profitableness, taking them at their present actual scale of business, and supposing them free from unproductive cost and rivalry, the precise position in which the Philadelphia and Pottsville railway will be placed, that is free, from competition in the carriage of coal at \$2 per ton, and in being secure against a rival, at least from the Schuylkill region, which furnishes the red ash coal *exclusively*, as well as all the other sorts.

NEW YORK AND PHILADELPHIA—87 miles.

Travel—182,000 passengers, carried in half

the present time, \$3 50 each, - - - \$637,000

Freight—14,000 tons on an average of \$7 per ton, 98,000

Carried forward, ——— 735,000*

* The highest gross receipts per annum on this line were in 1836, \$770,060; and in 1838, \$755,000. They have not been quite so great in these late years of depression. It is clear enough, what could be made here by one unbroken line, with three trains per day, and through in 4 to 5 hours, at a fare of \$24. It would get to be viewed as only an omnibus intercourse, and the receipts would be almost quadrupled

Brought forward, \$735,000

Deduct.

Cost of transportation. 182,000 passengers, at	
50 cents each - - - - -	91,000
Cost of transportation. Merchandize, - -	28,000
	<hr/>
	119,000
Repairs of road, renewals, etc., 87 miles, cost per	
mile, \$800, - - - - -	70,000
Salaries, etc., - - - - -	25,000
	<hr/>
	\$214,000
\$1,500,000 Loans, interest at 6 per cent.,	90,000—304,000
2,500,000 Capital equal to a dividend of	<hr/>
17½ per cent.	Nett, \$431,000
<hr/> \$4,000,000 Actual dividend paid only 7 per	<hr/>
ct. on a capital of \$2,900,000.	

PHILADELPHIA AND BALTIMORE—93 miles.

Travel—120,000 through passengers, at \$4	
each, - - - - -	\$480,000
Freight, mail, etc., - - - - -	121,000—601,000*

Deduct.

Transporting passengers at 60 cents	
each, - - - - -	72,000
Do. freight, at 40 per cent. on gross	
amount, - - - - -	37,000
Management, repairs, etc., 93 miles, at	
\$800 per mile, - - - - -	74,000—183,000
\$2,200,000 Actual loans at 6 per ct.,	132,000—315,000
2,200,000 Actual capital equal to a	<hr/>
dividend of 13 per ct.	Nett, \$286,000
<hr/> \$4,400,000 Actual dividend paid only	<hr/>
7 pr ct., on \$2,200,000.	

* These receipts are according to their report of this year, and but that they are saddled with the river route, and for the interruption at the Susquehanna, the result would be more favorable; as it is, there is no safer investment for 7 to 8 per cent. per annum. Fears are sometimes expressed for the long bridges across the salt water inlets, which are not subject to freshets, and the wood, almost imperishable in salt water, is withal, a cheap article on that line.

PHILADELPHIA AND COLUMBIA—82 miles.

Travel. 75,000 through passengers, same as in 1838, at \$3 25 each,	\$243,500
Freight. 90,000 tons, including all charges at \$7 50 per ton, -	675,000
Mail, - - - - -	24,500—\$943,000*

Deduct.

Motive power, per Canal Commission- ers' Report for 1840, - - -	200,266
Repairs and use of cars by forwarding men at \$1 50 per ton, - - -	135,000
Repairs and use of cars by forward- ing men for passengers, at \$1 each, 75,000—	210,000
Management, repairs, etc., on 82 ——— miles, at \$800 per mile, - - -	65,600
Expenses at inclined planes, etc., - 15,000—	80,600—\$490,866
\$4,300,000 Cost with motive power, equal to a divi- ——— dend of 10 per cent.	Nett, \$452,134

These estimates will serve a good purpose, if only as materials for thought, and they are accurate enough for that purpose.

Here then are three principal railways, which, instead of raising the character of this species of improvement, have, from one cause or another, totally extraneous to them as railways, only depressed it in public estimation.

In the case of the two first roads, few advert to the fact of neither of them being worked *continuously* by one set of cars and engines through, but that they are *made up of pieces* of road.

In the case of the Columbia road, its mixed management by State and forwarding men, affords no tangible results to the public, with whom it is only a by-word for waste and extravagance, but withall shows itself capable of yielding a profit to *some one*, and the State

* For the year ending 31st Oct., 1838, there passed over the whole length of this road, 82 miles, 75,612 passengers, 87,180 tons merchandize. And a writer in the *Railroad Journal*, made the road yield, on a capital of \$4,400,000, 12½ per cent. surplus, upon data furnished by the Superintendent.

The charge on this road is 37½ cents per 100 lbs., or equal to \$7½ per ton, Philadelphia to Columbia, which includes motive power, use of road, and use of cars, etc.

authorities are beginning to discover that it would have answered better under *one* management. This road does the largest freighting business of any in the United States at present, and under a revised system of economy, (which we hear has lately been adopted,) could be made very profitable.

As showing the cost of transporting a passenger over the following roads in particular, the statement below may be of service, but it can be no guide for other roads.

Utica and Syracuse, 53 miles, 122,000 passengers carried for \$69,400, or 57 cents each.


Mohawk and Hudson, 16 miles, 188,000 passengers carried for \$68,100, or 37 cents each.

Utica and Schenectada, 78 miles, 135,000 passengers carried for \$87,400, or 67 cents each.

These charges include all expenses of repairs to road, etc.

That the roads we have exhibited above, as they *should do*, perform so well under their many drawbacks, speaks loudly in favor of the system; and as they are frequently cited against it, the circumstances under which they operate, should be considered and allowed for, when they are brought up in disparagement of roads having *no analogy* to them.

No. 9.

It is yet one of the results required to be determined by further experience, what weight and form of rail accomplishes the safest, and consequently the cheapest transportation, without any *waste* of iron. It has been thought that 45 to 50 lbs. to the yard are *adequate*, under the present system of a more *equal distribution* of the weight of the locomotive. Ample security against deflection in the rail is the point to be attained. On several of the roads in England they have different weights of rail, from 50 to 75 lbs. to the yard, in sections as experiments, the results of which are not yet quite determined. On the Great Western road, under charge of Mr. Brunel, the bridge form  has been adopted, weighing only 56 lbs. per yard, which he has deemed sufficient. On the Philadelphia and Pottsville railroad, for its heavy downward trade, 60 lbs. per yard has been suggested as ample, whatever form of rail may be selected.

The plate rail, has been a source of much loss of both money and

reputation to railways, and is now generally discountenanced, except for short lateral roads, and there even a stout bar is often used. On the roads in the mine drifts at Pottsville, the *cast iron* bar of 27 lbs. per yard is now being profitably used, a horse drawing on it double the load he was able to do on the plate rail. The power of the locomotive over the *edge* rail is at least 20 per cent. greater than over the *flat* bar, and there is no comparison as to the saving in repairs to road by the one and by the other, as shown by the report of the Baltimore and Susquehanna railroad. Thus,

On the <i>flat</i> bar the repairs per m. per an., were equal to	\$543 06
On the <i>edge</i> rail, do. do. do. do.	142 40

And the saving to the machinery would be in nearly the same ratio. Although this is comparing entirely new with old work, still the saving by the edge rail is very considerable, independently of the additional power gained by it, as just stated.

No. 10.

As regards the travel on this road it has progressively increased since it was opened in December 1839 to Reading, and now averages about 45 through each way per day, as per the statement from the road for 1840.

Total Passengers.	Equal to thro' Passengers.	Tonnage.	Gross Receipts.
90,516	33,225	16,850	\$100,764

The road to Norristown, 16 miles, also takes a large share of the travel for that distance, and adds much to the activity and business along this beautiful valley of the Schuylkill. The allowance of only 68 through passengers from Pottsville, is apparently very moderate, and many think 100 through per day to start with, would not be too many, particularly if the company aim to make Pottsville, by a *moderate* fare, a great *focus* of travel, embracing the whole of the Susquehanna valley; in which case the item of travel, now regarded as secondary, will become a principal source of revenue at the outset. Neither have the back freights been much relied upon, but when the coal trade to New York assumes a new form by the railroad and Delaware and Raritan canal, as one more of *barter* than as now of *cash*, it will be reasonable to expect that the return of so many *empty boats and cars*, charging only 3 to \$4 per ton on rough goods for 204 miles by water in part, and 181 miles by railway entirely, "*New York to Pottsville*," will have the effect of *creating* trade, all of which, would be so much clear gain over our present estimates, to the road.

Pottsville should be made to New York for fuel, what Albany is to her for bread, and the *ton* of coal and *barrel* of flour be obtained at the same price, say \$5 each, and this will be done so soon as the opportunity is afforded to her intelligent merchants, by the opening of these communications. New York may then vie with Philadelphia in the trade on the Pennsylvania works, by being thus brought so near to Sunbury, at the forks of the Susquehanna, which will infallibly, become a place of depot, to which the boats from the *Juniata*, distant from Sunbury only 35 miles, will resort, in place of making the long journey to Philadelphia and back, by which near *a week* could be saved. This is a revolution which is sure to be effected in the course of time. New York now takes 300,000 tons of anthracite coal at an average of \$7 per ton, or \$2,100,000, and which will be continually on the increase. How important to her then, to foster a system of barter, in place of paying, as now in hard cash for it.

No. 11.

In England, abundant proof is afforded of the profitable carriage of freight, but we will cite the experience in this country, per reports from the following parties in the year 1840 :

ON THE CENTRAL RAILROAD—Georgia.

"The opinion has generally prevailed that a road, to be profitable, must have a large amount of travel, and that the only source of profit is the transportation of passengers, and that as a general rule, the freight of heavy commodities yields little or no profit. The experience so far, on our road, demonstrates in the most satisfactory manner the *error* of this opinion. Our freighting business is more than *double* that of passengers and the mail, and this has been done under the disadvantage of having but one train for both purposes, and consequently keeping up *a speed* altogether too great for the most advantageous transportation of freight."

"I have no doubt that freight trains, with full loads, and a velocity not exceeding 10 miles per hour, would yield as much profit per trip, as passenger trains carrying fifty passengers each way. I am confident the merchants will find it to their advantage to abandon altogether the steamboat business on the Oconee and Ocmulgee river."

Signed

L. O. REYNOLDS, Civil Engineer.

ON THE GEORGIA RAILROAD.

"I can now state with confidence, that wherever the transportation is of a mixed character, such as agricultural products, general merchandize, and passengers, and sufficiently large to justify the construction of a good railway, that railways will be found to be not only the most expeditious, but the *cheapest* artificial means of conveyance at present known."

"It should be taken into consideration that the down freight is principally cotton, bulky and expensive to handle, yet we find it leaves the rivers and seeks the railway. Facts of this kind are worth more than theory,"

Signed,

J. EDGAR THOMPSON,

Civil Engineer.

No. 12.

"The superiority which long lines of railway possess over short ones in the economy of transportation, is abundantly manifest in the experience on the Mohawk and Hudson railroad, it having been ascertained that the cost of transportation on that road (exclusive of the expense of stationary power at the inclined planes) is but little less than the total cost for a level road of twice or perhaps three times the extent. This road is sixteen miles in length. The results are similar on other short lines of railway."

The foregoing extract is from a report by Edwin F. Johnson, Esq., Civil Engineer, advantageously known in the State of New York for his acquaintance with the subject of her public works, and for his practical knowledge of canals and railways, the progress of which he has followed up and studied, and he is now, we have reason to know, the more confirmed in the following views, expressed by him in 1829, on the preference which railways would have over canals; an event which, after twelve years, we are now only about realizing.

"That railways, as a means of intercommunication, possess properties which in many situations will render them superior to canals, and that, with reference to the United States, railways, when properly constructed, will be found the more valuable and effective, and that, ultimately, when their merits become better known and more fully appreciated, by far the greater portion of the inland trade will be conducted upon them."

No. 13.

The following are statements of the operations of railways in different sections of our country. It is not possible to find two roads under such a parity of circumstances as to make the results on one, any true rule for those on another. Some applicable hints are always gained by comparisons, and it is pleasing to find a liberal interchange of experience among the various roads, most of which seem to be advancing in economical management and profitable business. It is the *lack* of this last, *not the ability to do it all*, of which railways have to complain. And will not the position of the Philadelphia and Pottsville railway, therefore, be a novel one, in its being a question whether it be competent to do *all* the business *actually upon its line*? That this position, however, is not likely to be a *distressing one*, the evidence we have adduced, will we trust, be convincing.

NORTHERN ROADS—PASSENGERS ALMOST EXCLUSIVELY.

	Miles.	Gross Receipts per annum.	Expense per annum.	Through passengers per annum.	Per cent. of expense on gross receipts.	Dividend, in 1839.
Utica and Schenectada,	78	400,700	113,700	130,000	28	11 per cent.
Utica and Syracuse,	53	251,200	69,300	122,000	27½	11
Mohawk and Hudson,	16	150,500	68,000	188,000	45½	7
Camden and Amboy,	92	655,300	258,000	182,000	39	7
		<u>\$1,467,700</u>	<u>509,000</u>	Average 34½ per cent.		

EASTERN ROADS—ABOUT HALF OF RECEIPTS BEING FOR FREIGHT.

Boston and Lowell,	26	241,200	92,100	38	8 per cent.
Boston and Providence,	41	312,900	93,600	30	8
Boston and Worcester,	44½	231,800	126,400	54½	6
Taunton Branch,	11	58,000	40,700	72	6
Eastern Railroad,	25	125,600	53,200	42½	4½
Nashua and Lowell,	14½	55,000	29,900	54	6
		<u>\$1,024,500</u>	<u>435,900</u>	Average 42½ per cent.	

SOUTHERN ROADS—RECEIPTS MAINLY FROM FREIGHT, EXCEPT THE LAST AND FIRST.

Balt. and Washington,	40	202,700	85,200	42	7 per cent.
Baltimore and Ohio,	88	433,000	280,200	65	4½
Georgia Central,	110	113,800	34,400	30	8
Georgia Railroad,	87½	184,600	70,300	38	9
Balt. and Philadelphia,	93	490,500	164,100	33½	7
		<u>\$1,424,600</u>	<u>634,200</u>	Average 44½ per cent.	

From the above variety of proportions borne by the *general expenses* to the gross receipts of railways, we gather that 40 to 45 per cent. would be a fair average for the roads here enumerated, leaving 60 to 65 per cent. to pay interest on loans and dividends on capital. But it should be remembered also, that at very little over that ratio of expenditure, a larger business could be done, and larger profits divided. This idea will be more clearly conveyed by stating the fact, that on the Grand Junction railway, in England, the cost of motive power was reduced \$45,000, and the receipts at the same time increased \$70,000 in the year 1840, as compared with 1839. This and some other English roads justify about the same average ratio of expenses, of 40 to 45 per cent., but they are there burthened with government dues, etc., from which our roads are comparatively free.

The above railways are gradually growing into public favor, and we hope soon to see them holding the same ground that we find by the last *London Bankers' Circular* railways now hold in the monied circles of England, and from which we quote as follows:

"Regarded as property of permanent investment for income, and not merely as speculative things to be bandied from hand to hand, on the faith of conspicuous names and exaggerated representations, we have a higher confidence in railway shares generally, than we had when we wrote upon the subject two years ago. Therefore, viewed as valuable annuities, investments in the leading lines must be considered safe. We are giving no opinion of the present marketable value of shares, that may be more or less than the annuity is worth, but merely asserting that the system is so far in advance of the experimental stage in which, on former occasions, we considered it, as to warrant the description, that it has worked out *a valuable property*, which as such may now be set down, *as being permanently established*. London, 6th February, 1841."

And it further adds, that Government now regard them with much favor, from the uninterrupted regularity and despatch with which they deliver the mails in winter, as compared with mail coaches on common roads, even where the latter are so perfect.

The position of the railway as to fuel is a very important consideration: in the northern and middle States it forms more than half the expense of motive power. On the more southern roads the abundance of pine wood, and its greater efficiency in generating

steam, reduces this proportion to one-fourth of the cost of motive power, and they there gain something, also, in the greater cheapness of slave labor.

The following will give a sufficiently correct view in round numbers of the *business load* which a locomotive weighing, say 11 tons, and *working within* her power, can carry, *comfortably*, at an average speed of 10 miles per hour, over the following grades, with the cost of transportation affixed to each. Heavier engines would, of course, do more work, and at something cheaper.

Level,	83 cars, 3 tons each,	nett freight 250 tons at a cost of 53 cts pr ton pr 200 miles.								
10 ft. grade,	60	"	"	"	180	"	"	62	"	"
20 "	50	"	"	"	150	"	"	67	"	"
30 "	40	"	"	"	120	"	"	75	"	"
40 "	30	"	"	"	90	"	"	90	"	"
50 "	25	"	"	"	75	"	"	100	"	"

The above "costs are based upon the locomotive costing \$50, and the cars \$1 each, for two trips of 100 miles each, or two day's run, and that they carry the above loads only half the distance, returning empty the other half—the per ton cost being of course reduced nearly one half of those rates, if they obtain an equal loading both ways, or remaining nearly the same if they make up the full load, as assumed above for two days, by those carried either way. On the regularity of the loads depends much the profitableness of freighting, and, as already shown, this obtains most in mineral districts. As showing the power of the ordinary sized locomotive, and the charges incident to mere transportation on such grades, the above statement is near enough, and can be applied to any road, by dividing the amount of load it may be equal to deliver in two days, upon the expense for locomotive and train for that time, which implies a run of about 100 miles each way. In regulating the charge for freight, over these costs of transportation, it must be done with a view to pay repairs and renewal of road, interest on loans, incidentals, and, lastly, dividends on capital, and in the liberal spirit of *encouraging* business over the road. The higher grades on a road are often, however, only for a short distance, which, by assistant motive power, can be overcome at only a small charge on its general business, and the advantage of near a level throughout be attained.

After a unity or an unbroken connection in the terminations of a road, and the facilities that may be found at them, (and in which a road may be so deficient as to frustrate nearly all its other advantages,) the grades determine its real value, just as it may be with the dimensions and multiplication of locks on canals.

No. 14.

The authority of high or conspicuous names is so often a passport to error, that when assertions, deeply affecting the public welfare, are boldly and *deliberately* put forth by them, they should be noticed, and if possible, corrected. Of this character, is the assertion of Judge Hayes, of Pennsylvania, at the opening of the Conestoga navigation, in November, 1840, when in a public address, he remarked "That navigation must ever be the *cheapest* artificial means of transportation for the reason, chiefly, that the auxiliary element of motive power is furnished by nature *without stint and without cost.*"

Here is at once embodied the creed of the canal advocates, on whose standard is also proclaimed, that "*Canals are always growing better while railroads are always growing worse.*"

The time has indeed gone by, when an elaborate argument would be necessary to refute a fallacy like the above, as too many are now sorrowing over the discovery of it, both in a private and public sense, by their utter ruin.

Even where it cannot be denied that this auxiliary element of motive power is not *stinted* by nature, such as on the Hudson, Mississippi, Ohio, etc., even down to their great father, the Ocean, of how little comparative use are they except at the cost and aid of steam. In short the old standards are destroyed, and the advantages of every pursuit or undertaking, whether moral or physical, are now measured by economy of time, which is the great necessity of the age, and that for which there is the most strife. Days are now reduced to hours, and as the mind of the whole civilized world is, as it were, operating in one crucible, we may expect to see hours compressed into minutes, and even that not the final residuum. And as if to set at defiance this acknowledged value of time, in all commercial operations particularly, it was officially proclaimed in the State of New York, "That for all commercial purposes the diminution of the cost of transportation on a canal one-half, is equivalent to a reduction of one-half its length. The completion, therefore, of the enlargement of the Erie canal will abridge its total length from 364 to 182 miles."

Steam power, for the present, is the great agent which is overthrowing all these *heresies*, and if we would enlarge the sphere of

its usefulness, can the attainment of an *unlimited access* to the region of fuel, apart from any selfish considerations, be too strongly urged; as being the source of this economy, about which, as we have before said, there is so much strife, and which is already so efficient on a railway, while scarcely applicable on a canal, that the former is now sure to attain the ascendancy, whenever they come in contact, and the business is insufficient for both; in proof of which we can refer to the fate of the *Farmington* and *Hampden*, the *Blackstone*, and the *Middlesex* canals, all of which have, from this cause, fallen into entire or comparative disuse:

In England, in the mineral districts, such is the immense tonnage transported, that there is generally business enough for both; and we have been assured by an English miner, that having the option of a canal or railway from his mines, that the *latter* was always used *in preference*.

The canals, to whose fate we have just adverted, being all in the Eastern States, where the *extra sagacity* of the people is proverbial, such sad experience could not fail to convert them into the most earnest *champions* of the opposite system of railways. In testimony whereof we adduce the following *eloquent*, and, therefore *true* passage, from the report for 1839, on the construction of the great western railway from Boston to Albany, which we do with the more pleasure, as they are now acting on the faith of it throughout the Eastern States, with a vigor that will not abate until they are encircled by a network, calculated to give the utmost concentration to their industry, already truly marvellous.

“Railways have universally created the means of their own sustenance, and have drawn to their tracks employment for their motion. If the beneficence of Providence had hollowed a channel from our coast to the Western Lakes, and poured the floods of those inland seas eastward to the ocean, the blessings would have been too great for sufficient gratitude, as they would have been beyond all computation. The river, swelled by tributary streams from every valley, would have scattered wealth along its course. For all practical purposes, the invention of art bestows better advantages, and furnishes communication more easy and certain than the bounty of nature could give. During the stern winter of our climate, the rivers are closed one-third of the year with ice, in summer they are exhausted for nearly an equal period; their navigation is bounded by the hills that supply their fountains. The rail-

road is neither locked by cold, nor dried up by heat, nor confined by ridges, stretching out its arms to every town and village, it may be extended beyond the highland barriers of water passage, and beyond the Lakes, until its iron bands clasp together in a net work of improvement, overspreading the whole Union."

The above is the best commentary we can offer on the remarks of Judge Hayes, with which we commenced this note. But it must not be inferred that we can see no merit in a canal, or no location in which they would not perhaps be preferable to a railway. Those, for instance, connecting *main waters*, such as the Delaware and Chesapeake.

Delaware and Raritan.

Erie and Hudson.

Ship canal, round Niagara Falls.

Ohio and Erie, connecting the lake with the Gulf of Mexico.

Illinois Ship Canal, connecting the Illinois river and lake Michigan.

The Rideau, in Canada, connecting Kingston on lake Ontario with Montreal on the St. Lawrence.

The Welland, in Canada, connecting lake Ontario and lake Erie.

The Caledonia, in Scotland, connecting the North Sea and the Irish Channel.

The Atlantic and Pacific, *proposed* to connect the two Oceans across the Isthmus of Panama, and some such others are legitimate enough, although they may be made long before there is adequate business to support them, but which may be justified by their great *national importance*. The true doctrine, however, is now that, with scarcely an exception, they are only to be constructed after the business between the two points can no longer be fully accommodated by a railway, which is not likely to occur often in this country for a long time to come.

Of canals, where railways would have answered better, the following are specimens, as well in the State of New York, as in Pennsylvania. The great success of the Erie canal in the former, and of the Schuylkill canal in the latter State, have already been noticed as peculiarities and the effect of monopoly, but which is likely to be checked by the diversion of the traffic through new avenues, unless it far transcend in the future, as we hope it may, our present anticipations. These deficiencies are ample evidence of the expensiveness of canals in repairs and maintenance, and the records of private works of this sort, furnish equally ruinous results. Should the proposed measure of the admission into England

of our agricultural products prevail, it will undoubtedly give a new impetus to all our public improvements.

<i>New York State Canals.</i>	<i>Length in miles.</i>	<i>Deficiency from commencement to 1840.</i>	<i>Pennsylvania State Canals.</i>	<i>Length in miles.</i>	<i>Deficiency from commencement to 1840.</i>
Oswego canal,	38	263,574	Juniata Division,	130	101,076
Cayuga and Seneca,	23	146,497	Western Division,	105	1,821
Chemung canal,	39	241,144	Delaware Division,	60	51,866
Crooked lake,	8	69,817	Susquehanna Division,	39	172,523
Chenango,	97	479,560	North Branch Division,	73	327,065
Black River, (unfinished,)	38	58,711	Western Branch Div'n,	72	372,878
Genesee Valley,	35	122,192	French Creek Division,	45	129,211
			Beaver Division,	25	128,158
	278	1,386,495		549	1,284,597
These deficiencies include interest on cost.			These deficiencies exclude interest on cost.		

The mode of stating the accounts, either in Pennsylvania or New York, is not very strict, as for instance in the latter State, a recent loan of \$50,000 for rebuilding the wooden locks of the Chemung canal, and several other items, are charged to *funded debt*, and the new work in locks, aqueducts, etc., on the Erie enlargement, is in lieu of repairs that must otherwise have been incurred. These large deficiencies have undoubtedly been assisted by the totally inadequate business for these particular canals, but had they been railways, even of the early imperfect structure, the result could not have been so disastrous, with their quadruple resource in *freight, toll, passengers*, and the *mail*, and withal *perennial*! Inexperience may be pleaded against reproach for the past, but for the future, the indiscriminate cry, that the canal is cheaper than the railway should be hushed; the latter having now the decided advantage, in being by far the most efficient and useful improvement, particularly for this country, where the tonnage generally is not likely for some time, to be in any thing like a fair proportion to the anticipated means of transporting it. And it should be remembered, that as yet, in this country, the railway advocates have had but comparatively blunt weapons with which to face their antagonists, and that, armed with Damascus blades, as they would be by the completion of such works as the Philadelphia and Pottsville, New York and Albany, and Philadelphia and New-York *remodelled*, the contest would be still less doubtful.

That it may be understood what we mean by being cheaper, we make the following contrast, and which can be appealed to as true in fact.

By Steam Power on the Ocean, it is cheaper on merchandize across the ocean at pr ton - - -	71	than	21 fcs	by vessels.	{ On fine goods and embracing nearly all that pay best for carrying.
By Steam Power on river and railway it is cheaper on light merchandize at per ton - - -	\$17 for 100 ms.	than	\$5	do.	{ As between N. York and Phil. business being check'd by the high rate.
By Steam Power on railways it is cheaper on light mdz. at per ton -	25 for 470 ms.	than	21 riv. and can.		{ As between N. Y. & Buffalo.
By Steam Power on railways it is cheaper on heavy indz. at per ton,	2½ for 100 ms.	than	2	by canal.	{ On coal requiring the lowest cost of transp. it is cheaper on a <i>suitable</i> railway.
By Steam Power on railways it is cheaper for a passenger at - -	4 for 100 ms.	than	1	stage coach.	{ Between N. Y. and Phila. the railway would be preferred.
By Steam Power on railways it is cheaper for a passenger at - -	75c. for 40 ms.	than	12½c.	steamboat.	{ As seen between New-York and N. Brunswick.
By Steam Power on railways it is cheaper for a passenger at - -	1½ for 150 ms.	than	nothing	do.	{ As between N. York and Albany for <i>business</i> travel.
By Steam Power on railways it is cheaper to carry the mail at \$500 per m. pr an. than at nothing by stages.					{ On all main Routes.

This shows an inversion of the usual order of things, in the higher being the cheaper rate, and is a practical illustration of the *immense* but imperceptible value in saving of time. Thus, in the comparison, the stage coach sailing vessel and canal boat, are the *positive*, the steamboat and steamship, *the comparative*, and the railway, the *superlative* of cheapness, as a general rule. Some would except coal from this rule, but they are mistaken, under *the circumstances here* of its distance from tide water, and its imperfect avenues by canal, and these closing at the moment of greatest need. A railway, which besides obviating these *difficulties*, brings other advantages, must get the ascendancy.

No. 15.

That the valley of the Schuylkill is destined to be the funnel through which the travel north and west must, in a great measure, find its way to the seaboard, will be evident to those who will look at its central position. The Governor of Pennsylvania, in his late message, alludes to the importance of finishing the connection between Elmira and Williamsport, as the nearest route to Philadelphia from Buffalo or Dunkirk, on lake Erie. Cleveland and Toledo are, however, the points on lake Erie aimed most at by all the rival

cities, as the nearest to the Miami canal, from which issues nearly all the far western trade. From that point, through Pittsburgh to Philadelphia, a re-survey of a route has lately been made by Mr. Schlatter, which he calls the *middle one*, by which the Portage railroad is avoided, and having no higher grades from "Cleveland through Philadelphia to New York," than 45 feet per mile.

The comparative distances are as follows:—

From Cleveland, by Dunkirk and New York and Erie	
railroad, to New York, - - - - -	654 miles.
From Cleveland, through Pittsburgh, to Philadelphia, 478,	
and from Philadelphia to New York, 85, - - -	563 "
	<hr/>
	91.

Say ninety-one miles nearer to New York, *passing through Philadelphia*, than by any other route. The immense advantage to Philadelphia of such an improvement will be better understood by studying the comparative costs of western transportation to Buffalo, Pittsburg and Dunkirk, as now, and as proposed to be managed by canal and railway, per note No. 22, and what it could be done at on this improved line, called the "middle route." Prospectively, therefore, these are all important facts for an improvement down this great outlet of the valley of the Schuylkill, of which we make no account now, however, as in the meantime it will have its *hands full* with the adjacent travel and the coal trade, the latter and other minerals already shown to be the *most profitable* species of freight for a *level railway*.

No. 16.

To show the immense capacity of a railway, having the drawback of grades of 50 feet, at which stationary power is used, for carrying freight and passengers, we cite the Stockton and Darlington in England, over which there passed in one year,

200,000 passengers,
690,000 tons,

principally coal, which is carried 25 miles, about, at a rate exactly equivalent to \$2 per ton, for 100 miles, or *the same rate* proposed to be charged on the Philadelphia and Pottsville road. It makes 14 per cent. clear, and divides 10 per cent., 4 per cent. being reserved as a sinking fund. The price of the stock is £275 for £100 paid. *The loads per trip* carried over this road are about 65 tons nett of

coal, of which they make three per day, while over the Philadelphia and Pottsville road, *four times* that quantity could be carried at one trip. Can any possible reason be given therefore, why the latter road could not be worked, at least as advantageously, *nay, even more so* (2); unless we are prepared to consider ourselves *inferior in efficient labor and ingenious contrivance* to the European, after the late William Cobbett had justly ranked us in those attributes above them all. The weight of rail on this road, which has been in operation fifteen years, was originally only 28 lbs., but it has since been increased to 64 lbs. per yard, and is subject to from *four to five times more friction* than will be incurred by the Philadelphia and Pottsville road, delivering the same quantity; all hopes, therefore, that this road will break up in two or three years must be utterly fallacious.

In order, however, to facilitate the bringing over the road so much tonnage, the object should be to diffuse the shipment of it equally over the whole year, by holding out lower rates of toll at those periods when consumers are least disposed to stock themselves, and when the competition of the canal prevails. A great point of economy would thus be attained by the road, in being enabled to adjust its machinery to *nearly a certain standard of work per month*, say 50 to 60,000 tons per month. It is thus only that the utmost efficiency in working the road can be attained, and as there must be a *community of interests* from the miner down to the consumer, a co-operation to produce this and every possible economy from it, will no doubt be given throughout every link in the chain.

According to the views of an experienced dealer, the following distribution of seasons, and tariff of tolls adapted to each, may serve as a useful memorandum, to be hereafter better elaborated by wiser heads.

Months.	Tons.	Per Ton.	
1st April to 30th June, 3, demand slack,	155,000,	\$1 50,	232,500
1st July, to 31st Oct., 4, " active,	250,000,	1 75,	437,500
1st Nov. to 31st M'ch, 5, " brisk,	195,000,	2 50,	477,500
—	—	—	—
12	600,000		\$1,147,500
			—
Average, - - -	- - -	\$1,111,111	pr ton.

The rates of fare and toll on the Stockton and Darlington railway were put *very low*, a reason given for the immense increase of

its business. Indeed this subject is now attracting attention in the United States, and particularly in the Eastern States, from its great success in England, but looking at the great disparity in the population and business of the two countries, and the greater *density* of both in England, the *full* application of the rule to this country cannot hold, except perhaps in the Eastern States. We extract the following from a pamphlet lately published on the subject in Boston, by P. P. F. de Grand, a distinguished champion in the good cause.

"We also learn from a first rate source that *the total cost per train* on a well built and well conducted American railroad, does not exceed *the like cost* on a *like* European railroad. This gives the more value to European statistics, which show so conclusively that the lowest rate of *fare* and of *freight* yet tried on any of the European railroads, has been found to produce the *largest nett income* to the road."

The most productive rates, as applicable to England and the Continent, for travel were 2 to 2½ cents per mile, or 2 to \$2½ per 100 miles, a somewhat *higher* rate being charged for the way or intermediate travel.

No. 17.

The valley of the Schuylkill is already distinguished for the production of iron, and the extension of it is ably discussed in a series of articles in the Pottsville Journal, and in which that place is held up as the *cheapest* site for it. The ore and coal are in juxta position, the average yield of the former is stated, per analysis of Professor Rogers, to be 35.66 per cent., and the estimate for making iron and forwarding it at all seasons of the year to Philadelphia, is thus made up:

3½ tons of ore at \$2 per ton,	\$7 00
1½ " coal at 125 "	2 18
1 " limestone "	1 60
Labor, etc.	2 40
Interest, repairs, incidentals, etc.	82—\$14
Transportation to Philadelphia,	3—\$17 per ton delivered in market at Philadelphia.

This anthracite iron is a great acquisition to the country, and to *Pennsylvania* in particular; its use in all common castings will fill a

large demand, and when made of the *right sort of ore*, it makes good foundry pig, as we have been assured by those who have tried it, and in time will attract much capital to the region. Further north, on the Susquehanna, at Danville, using the Bloomsburg ore, which yields near 50 per cent. and is within a few miles, the foundry pig produced from it is excellent; and that site will rise into great consequence in the manufacture of iron, whenever the connections with Philadelphia are perfected; an event, indeed, which will render the whole of that portion of the valley of the Susquehanna rife with business and enterprise.

No. 18.

How many, unmindful of the fact, that the inventive character and spirit of the age is ever treading on the heels of the last improvement, and superseding on the morrow that which yesterday was thought perfect, still hold to their first impressions, and are unwilling to believe that they can have become so soon obsolete. Error, propagated *under authority*, is the more to be lamented, as it becomes so hard afterwards to eradicate. This has often occurred in the controversy between canals and railroads.

Thus, we go back only five years, when locomotives and railroads were yet in their cradles, and we find the following information reported to the Legislature of New York, by their *State Engineers*, in 1835, Assem. Doc., 296, and which will contrast oddly with the facts of the present day, as given in note No. 13.

"That experience had so far settled the cost of transportation on a *level railroad* at $3\frac{1}{2}$ cents per ton per mile," or \$3.50 per ton for 100 miles, and that an engine of $6\frac{1}{2}$ tons could only draw on a level,

					75.25 tons gross load.
On a 10 ft. grade or ascent per mile,	do.			49.53	do.
do. 20	do.	do.	do.	37.35	do.
do. 30	do.	do.	do.	27.24	do.

It is evident that these engineers rather inclined to the canal interest, for it was proved that at the time their report was *being made*, engines even then had drawn treble the amount allowed by them, or 11 tons gross, and since we know, that they have drawn over a level near 500 tons, and 250 tons gross over a 40 feet grade.

Those who will, therefore, rightly apply these facts, will not be at

a loss to understand how a railroad can now carry *on a level* at the rate of $\frac{1}{2}$ cent per ton per mile, or 25 cents per 100 miles, having always a *full load* of 200 tons for that distance, instead of \$3,50 per ton, a rate indeed, which on roads less favorable than the Philadelphia and Pottsville, will on many articles be considered remunerating.

It was on such information as the above, that the enlargement of the Erie, and construction of the Genesee Valley, and Black River canals were undertaken, and now that the first project is beginning to be thought ill-advised, its champions would seek to justify it, by stating that the present canal is only equal to 25,000, when it is clearly proved that it is equal to at least 55,000 lockages, more than double the number it has ever yet passed, while it is becoming annually relieved of the more bulky tonnage.

Very few people are aware that a railway could be constructed from Buffalo to Albany, with a descending grade all the way, which would enable it to carry, at a cost of only one-half cent per ton per mile, and thereby with *ample profit to itself*, admit of a reduction of 25 per cent. on the downward freight, and 50 per cent. on the upward freight per Erie canal, taking the rates of 1840 as a standard, which averaged \$9 per ton for the downward and \$25 for the upward freight, on merchandize for that year. If only, therefore, about one-third the sum proposed to be *wasted* in the enlargement of the Erie canal were applied to completing such a railway, it would be in consonance with the lights of the age, and of true economy, and a most judicious investment. The railroads now parallel with the canal are gradually forming a continuous line from Albany to Buffalo, and will ere long insist on being *unshackled* as to the carriage of freight, and the New York and Erie railroad, in course of construction, will also have become a participator for the *more lucrative* freight of the lake, at a point more convenient than Buffalo; and surely the day will come when Pennsylvania will have an avenue to her metropolis from *Cleveland*, a preferable point to them all. Nothing of all this, however, seems to serve as a warning to the enlargement advocates, but politics, together with stock and contract jobbing, which have already ruined Pennsylvania, seem to have more sway over them than the true interest of the State of New York.

No. 19.

The most important feature about a railway, is its grades; they *determine where* freight is the object, its ability to carry cheap

or otherwise. For this purpose 40 feet, up to 60 feet, are not now considered objectionable for short distances, to which assistant motive power can be applied without great expense. For travel, these grades are not made any account of, the improvements in the locomotive having overcome the greater portion of the difficulty formerly found in them. The same view is now taken of them in England, where it was once thought indispensable to overcome them at any cost, being thus in most cases prohibitory of the construction of the railway at all. The following extract from the proceedings for December, 1840, of the British Association, will explain the views now taken of the subject in England.

"The subject of gradients, or the degree of acclivity, which steam carriages can be made to ascend, involves the greatest part of the difficulties connected with railway communication. Until recently, the established doctrine seems to have been that a rise of 1 foot in 330, or 16 feet to the mile, was as much as steam carriages could be made to surmount with advantage. Mr. Vignoles explained to the British Association, that by lessening the load, the engines are now made to proceed at the required speed on gradients of 40 feet to the mile, and several railroads are being now made with gradients on that scale. He said that he had witnessed the ascent of an engine with five loaded wagons over a gradient of 250 feet to the mile, at a speed of 4 to 5 miles per hour. But as such steep acclivities were generally limited in length, the difference in the *whole rate of speed* on a long line is not materially affected. This fact proves conclusively that railways may be extended to the less level and more irregularly surfaced districts, at probably one-third of the rate of expenditure hitherto regarded as indispensable, and as *so much* is yet to be learnt about the locomotive, a far lower rate of cost than any hitherto found available in England, may now be contemplated as perfectly sufficient to ensure success."

No. 20.

Various sites in the interior of Pennsylvania, such as Reading, Lancaster, Danville and Port Dauphin, on the Susquehanna, are urging their claims to a preference for a National Foundry, on various grounds, but particularly because of their being inaccessible to an enemy.

Will any one pretend that Philadelphia could now be reached with her own 300,000 defenders, and the 400,000 more in New York and Baltimore as a reserve on either flank, all within five hours of

her and ready at short warning to repel an enemy, against whom they could bring to bear the most ingeniously destructive applications of steam power, along a line of 100 miles.

A large city, therefore, thus impregnable, is the true point for the manufacture of the means of defence, the congregation of talent and skill common to it, ensuring a cheaper and better article, with readier facilities for the distribution of it to other exposed points; while railroads from the interior pour in its hardy masses, on the instant, to give efficiency to the defences thus provided where most open to attack.

Such a point is Richmond, at the termination of the Philadelphia and Pottsville railroad, three miles above Philadelphia, and should be looked at in all its bearings, by all those who would seriously advise a National Foundry. The idea, however, has been started among intelligent men, that the Government would do wiser in resorting to private enterprise and skill, as well for their ships, as for their ordnance, and dispensing with both Foundry and Navy Yard, except merely as places of depot and of rendezvous. The old data, for the conduct of war, is now, however, all exploded by the inventions in steam power, and an entire remodelling in the main, of the systems of national defence will have to be resorted to.

No. 21.

Public documents but rarely meet the eye of the general reader, and private companies rather mystify than go into details, and the public never derive a clear idea from them. Railways and canals are alike implicated in this charge of want of distinctness in their reports.

We refer to the annexed official statement, to bring the reader better acquainted with the numerous items of expenditure on a canal, which are supposed by many to be a mere trifle. It should dispel such a delusion. And we ask of him, having first the leading features of the railway and canal well fixed in his mind, whether he is not struck with the *comparative exemption* from the ordinary causes of wear and tear of the former over the latter, and of the constant exposure of the canal to constant breaks and to be periodically swept away by freshets, while the railway is, or can be, generally placed aloof from such accidents or danger, and is never dormant, but actively employed the year through.

STATEMENT OF THE DIFFERENT HEADS OF EXPENDITURE ON THIRTY-TWO MILES OF THE CHAMPLAIN CANAL, IN CHARGE OF THOS. A. SHERWOOD, FOR YEAR ENDING 30TH SEPT., 1838.

<i>Structures or Work.</i>	<i>Whole No.</i>	<i>Total cost of Repairs.</i>
Locks, - - - - -	22	6,960 54
Lock tending, (exclusive of oil,) - - - - -		2,112 55
Oil for locks, - - - - -		42 16
New lock gates, - - - - -		754 86
Waste weirs, - - - - -		15 53
Culverts, cost of old estimated, - - - - -		792 45
Farm bridges, - - - - -	10	2,283 75
Road bridges, cost of old estimated, - - - - -	9	2,840 01
Repairing scows, - - - - -	5	640 56
Lock houses, store houses, and boat sheds, - - - - -	4	16 22
Timber sheds, and moving timber, - - - - -		40 05
Raising and repairing tow-path and berm bank, including repairs to slope wall, - - - - -		4,721 42
Cleaning out bottom of canal during spring repairs, - - - - -		1,051 03
Dams, - - - - -		376 99
New slope wall, - - - - -		1,543 27
Docking, new and old replaced, cost of old estimated, - - - - -		6,289 60
Repairs of breaches and watching canal, - - - - -		269 37
Tools, shovels, picks, crowbars, axes, wheelbarrows, etc., - - - - -		1,74 91
<i>Other works of consequence which do not come under any of the above heads.</i>		
Building tow-path wall at Whitehall, between canal and creek, - - - - -		5,337 56
Excavating rock and earth above and below new lock on Wood creek, - - - - -		1,595 06
Excavation for deposit of streams emptying into canal at Dunham, - - - - -		644 13
Building one new and repairing old crane, - - - - -		314 57
Removing old embankment at Whitehall, - - - - -		288 88
Building wall at Emprey's waste weir, - - - - -		244 84
Repairing guard gates, - - - - -		4 07
Excavating slate near Baley's, - - - - -		294 88
Superintendent's salary \$850, and clerk hire 199 50, - - - - -		1,049 50
Miscellaneous, - - - - -		866 53
Average, \$1,275 per mile, - - - - -		\$40,809 65

The canals in Pennsylvania particularly, are more exposed to damage and delapidation than most others, nearly all of them running parallel to rapid streams. The Erie canal, exempt from this danger, has been enabled to show a better surplus, and a lower average of annual repairs, which is made only \$700 to \$800 per mile, per annum, by the official reports from 1826 to 1838; but much has been seemingly saved since 1835 by the enlargement, the more strongly urged by its advocates on the ground of the necessity there would soon be for renewing all its *locks*, which with all canals, are fully if not more expensive than the renewal of the *sills* and *bridges* on a railway, where good drainage and good care obtains. The annual costliness of the Pennsylvania canals is exhibited in the call for appropriations in 1841 by the Canal Commissioners, as follows :

General maintenance and repairs, including \$150,000 estimated damage to Delaware Division by freshet of 8th Jan., 1841,	on 650 miles canal, \$1,072,600, tolls in 1840, 520,000
General repairs to railways, 82 Columbia and 36 of Portage,	118 " railway, 116,000, " " 588,000
	\$1,190,000 \$1,108,400

Being equal to \$1,650 per mile for the canals, and \$1000 per mile for the railways. Such is the contrast of expenditures and receipts, which fully refutes the claim of some that there is less wear by water than on iron; the former being always reputed among the most destructive of elements. It excites only regret, indeed, that a system so ill adapted to the character of our country and climate, should have been so heedlessly pursued. But there were not wanted warning voices, and we find the following views addressed to the people of Pennsylvania in 1831, '32, when her public debt was only fifteen millions, but which has now reached near forty millions of dollars.

"What shall we have gained when we shall have pursued the 'canaling system to completion? Only to pine in a state of financial exhaustion, which will unfit us for the pursuit of the *paramount* system of *railways*, already in such rapid progress in the hands of our more determined and successful sister States."

"And ought we not therefore to be aroused at the industry of 'our neighbors in the pursuit of what is now acknowledged by 'common consent, to be the order of the day, and *incomparably superior to canals*, which unhappily as regards Pennsylvania, will 'prove a *dead weight* to her energies and present resources."

All of which has been fully realized, and has destroyed for many years the ability of Pennsylvania, to carry out Mr. Schlatter's middle route of railway to the Lakes, which would make her at once paramount in the western trade.

No. 22.

That which first strikes one as most perishable on a railway are, the wooden sills and bridges, and it alarms the uninitiated as to their great costliness. But a little more inquiry will show it to be only a false alarm, and that almost every where throughout our country the replacement of the sills, and other wooden structures of the road, can be done at very little expense, and is likely to continue so for some time. For instance, on the Mine Hill railroad, terminating at Schuylkill Haven, which is now being re-laid with a heavy edge rail, the oak sills on it had been in service for nine years, and might have served a year or two longer, and which were replaced by new ones, costing 30 and 35 cents each. We have also heard of their being furnished to some roads at 25 cents, and we are assured that the Long Island railroad are not paying over 12½ cents per sill. Of course some allowance is to be made for size and kind of wood, but here is enough to show that a charge of 50 cents is full enough for the renewal of those on the Philadelphia and Pottsville road, particularly as wood will grow cheaper for many miles on either side of the road, by the greater use of coal, induced by it. Our allowance for the bridges is also ample, as the masonry part is of the most durable character, and the sum of \$450,000 includes the renewal of it, as well as of the wooden part, which has been selected well seasoned, and is otherwise especially protected by paint, slatting, etc., etc.

There is, moreover, great prospect of Dr. Earle's preparation of the sulphate of copper and iron, answering, at a cheap cost of ¼ to ¾ cents per cubic foot, in preserving timber, and if only five years can be added to its present natural duration, it will increase immensely the value of railways. The experiments, so far as they go, now of about two years, are indicative of a satisfactory result. Some are also being made by the government, and what has yet transpired in respect to them is favorable.

No. 23.

The loss in weight on coal, between Pottsville and Philadelphia on the canal, has always been matter of great complaint, nor can it be altogether corrected. By making the freight liable for defi-

ciency, some check has been put to it, and from 7 to 8 per cent., it has of late years on the average, been reduced to 3 per cent., about. By the decked boats of Packer's line, through from Pottsville to New York, the weight has in most cases, held out agreeably to the bill of lading. - The process of delivery by steam, however, will be *too quick* for any but *legitimate* waste, and which will be found the merest trifle whether by cars or barges.

The red ash being softer, burns freer, but wastes a great deal more than the harder white ash ; and of the 1 to \$1½ more, which is paid for the red from the yards in New York, \$1 is waste, it being more profitable to the dealer to sell white ash at 7, than the red at \$8 per ton,

No. 24.

The boat owners, or freighters, are altogether separate and distinct in interest from the canal, and could therefore have no motive, even if they would *dare* to contend against the railway, it being indeed rather to their advantage to adapt and transfer at once the boats to the Delaware, where they would escape being twice weighed while loaded, and other wear and tear, and where they would be more sure of regular employment than on the canal in competition with the railway. To show that this transfer would not be disagreeable to them, we copy the following extract from an article in the Miner's Journal, headed "Canals, Boats, and Boatmen."

"The Raritan canal is the boast of our boatmen, and it is really gratifying to all of them, when they get out of the Schuylkill with its curves, rocks, gravel points, sand bars, and ditches, and enter the beautiful navigation of the Delaware and Raritan canal."

The distance by water from Pottsville to Richmond is 123 miles, 108 of which are through a restricted and often impeded canal, while from Richmond to New York it is only 110 miles, 43 miles of which are through an unrestricted and unimpeded canal, leaving 67 miles of a free and cheap tidewater, and through the whole of which steam power can be used. How, then, can there be a doubt about a choice, unless you would expect of the sane to squeeze through the keyhole, when the door was wide open to them.

No. 25.

The onward progress of railways is well exemplified in the following comparisons:

Boston and Lowell, nett revenue, 1836,	89,800	
Do.	1839,	149,100
		<hr/> \$59,300 increase in 3 years.
Bost. and Worces'r, gross revenue, 1835,	119,100	
Do.	1839,	231,800
		<hr/> \$112,700 increase in 4 years.
Baltimore and Ohio, gross revenue, 1833,	195,700	
Do.	1840,	432,900
		<hr/> \$237,200 increase in 7 years.
Camden and Amboy, nett revenue, 1833,	181,000	
Do.	1839,	427,000
		<hr/> \$246,000 increase in 6 years.
Liverpool and Man'r, nett rev., 1832,	303,000	
Do.	1839,	556,000
		<hr/> \$253,000 increase in 7 years.
Columbia and Philadel., nett rev., 1835,	229,351	
Do.	1840,	449,267
		<hr/> \$219,916 increase in 5 years.

Such is seen to be the creative character of the railway, which by these statements, shows an average increase per annum of near 20 per cent., or doubling their business in five years. These roads are not adduced as singular cases, for not a road, however ill-judged it may have been, as to its affording any return to its proprietors, but can be shown to have had the good effect in greatly multiplying both the travel and business on its line.

The impetuous haste, therefore, for which we are noted as a people, is no unamiable characteristic when it leads to nothing worse than anticipating, by a few years, that which, like a railway, must rebound, in any tolerable location, in so much *general good*; and where blame of this kind was imputable at the start, the result in most cases has been to disappoint the worst forbodings, even while it has had and in some instances still has to carry many sins not its own, but which the public should hereafter be better able to distinguish.

The most successful case of a railway, depending principally upon travel, is that of the Utica and Schenectada. It traverses, to be sure, a great thoroughfare, it is of a fair length, 78 miles in a straight line, with grades of only twenty-five feet, has been economically built and managed, but having the drawback of a *flat rail*. It has lately made a return of its operations since its opening, which, as showing what a railway can do, where it has adequate business, we transcribe for the benefit of our readers:

Length—78 miles, single track.
 20 “ double track, midway.
 2 “ turnouts.

100 miles graded for two tracks.

Capital—\$2,000,000 paid in \$100 shares,	-	-	\$1,500,000
Right of way, paid from dividends,	-	322,500	
Purchase of Mohawk Turnpike, do.	-	62,500	
Sundries, - - - do.	-	17,000—	402,000
			<hr/> \$1,902,000

Total cost, equal for road to \$18,500 per mile, right of way, etc., \$5,000, together \$23,500.

It has been in operation 4 years, 5 months, up to the 1st January, 1841, during which time it has received from passengers, mail, etc., etc.,	-	-	\$1,618,500
The total expenses for the same period, average per annum 29½ per cent., were	-	-	552,800
Nett earning, 50 per cent. for 4½ years on \$1,800,000 capital,	-	-	<hr/> \$1,065,900

The dividends earned up to 1st Jan. 1841, were 13½ per cent. and equal to 11 per cent. divided on \$1,800,000 capital, at \$90 per share. This road is restricted from carrying freight, which it readily might do, by the State, who have also retained the right of *assuming* the road; no very comfortable position for the stockholders. For some reasons, best known to themselves, they have heretofore held that they *could not* carry freight, but which idea has been lately renounced, and application made to the legislature for the *privilege*, offering, as a consideration to their cheap opponents the canal, to pay its tolls and to reduce the fare on passengers, but the proposition was *at once* rejected.

The same good luck has attended the road in continuation of the above, the "Utica and Syracuse," the shares of which, amid the break down of other stocks, have increased 25 per cent. by profits added to the capital, after paying dividends.

Had the same predictions, which have been ventured upon in respect to the Philadelphia and Pottsville railroad been put forth in the outset of the two above roads as to their results; they would no doubt have been treated with equal scorn and incredulity. Yet go over our ground again, and who will say that the valley of the Schuylkill is not as great a thoroughfare *of freight*, as the line of the Utica and Schenectada railroad is of travel, having even *now* a fair share of the latter, and with a goodly prospect of a very large one; nor are the stockholders of the Philadelphia and Pottsville railway exposed, after it shall have conquered in the contest with canals and even with its *own kin*, railroads, mustering together some \$30,000,000 of opposing interests, to have the advantages of its triumph ever snatched from them, for the benefit of the public, who had rather frowned on the enterprise, and will not have even contributed *a smile* to facilitate its progress. And so let it be recorded.

The shares of the Utica and Schenectada, and those of the Utica and Syracuse roads, at a period of the greatest depression in all other securities, bore a higher quotation than any other stock, both having sold at 135 to 140 for 100 paid, and such will be the course with all main railways, that start clear of the wreck and entanglements of the last ten years.

No. 26.

There is nothing which government should foster and encourage more than railways, as the great arteries of the body politic and social. Certain suitable regulations against the overbearing tendencies of all corporations or monopolies, are all proper enough, and this, with some others of police, in their management for additional security to person and property, are receiving great attention at this moment in England, where otherwise the feeling of government is to encourage them in every possible way. It is, therefore, that we would have no tax or check on their earnings, as in New York, New Jersey, and Maryland, and the assumption by government should only be, when they are *unable* to be kept going by their own earnings. But as yet we know of no railway that is likely to fall into disuse, or is unable to keep its wheels greased at least. In Bel-

gium, where a regular government system of railways has been adopted, they take the most liberal view of the subject, and regard it as an establishment which should neither be a burthen nor a source of revenue, and requiring merely that it should cover its own expenses, consisting of the charge for maintenance and repairs, with a further sum for the interest and gradual redemption of the invested capital. At this rate, they are enabled, and do accommodate the public at the lowest possible rate of fares.

A grand system of railways is about being adopted for Ireland; and it is delightful to see the enlightened spirit with which all the Continental governments, and more particularly those not the most liberal, Russia, Prussia, Austria, etc., patronizing this great system. France tarries in the rear. Even *Cuba* is not last in the race, and this is the more remarkable, as no other system could be so operative for good on the masses, and therefore more *democratic* in its tendencies than a railway, or that will sooner *soften* the *despotism* of those governments. Liberalism and a railway are synonymous, that is, in the moderate sense of gradual amelioration of condition and spread of intelligence, better far than the violent *uprootings* of revolution. The King of Holland guaranties the interest on a railway rather than that it should not be constructed, in the very fatherland of canals: here, in New York, we fetter the railway that the canal may flourish, and then proclaim it *officially* the cheapest.

No. 27.

As a matter for future reference we quote the prices of coal for the middle of February, 1841, at a period of very intense cold.

In Philadelphia, large lumps on the Schuylkill at \$7 per ton, broken and delivered at the door, \$8½ per ton. Freights to Boston as high as \$3 per ton. In New York, Schuylkill red ash from the yard at \$9 per ton, Lehigh and Lackawanna, 8 to \$8½ per ton.

The greatest evil is, that these high prices now come at the most inclement, and to the poor the season of greatest destitution, the only remedy for which will be the opening of the railway to the Delaware, navigable the winter through, with the exception of a few weeks, and the price can then be kept nearly uniform, at from \$5 to \$5½ per ton.

In New York they have a resource, in periods of great scarcity, in foreign coals, the Liverpool and Pictou, the former usually sells at \$8 to \$9 per chaldron of 2700 lbs., which many prefer, and think

cheaper at those prices than the anthracite at \$6½ per ton of 2000 lbs. Into New York alone, the importations were in 1840, about 56,000 tons, and the whole importations into the United States were, in

1835,	49,969	tons, of 28 bushels, bituminous coal, from Liverpool and Nova Scotia.					
1836,	103,432	do.	do.	do.	do.	do.	do.
1837,	152,460	do.	do.	do.	do.	do.	do.
1838,	129,083	do.	do.	do.	do.	do.	do.
1839,	181,561	do.	do.	do.	do.	do.	do.

And against which the Pottsville dealers do not think themselves sufficiently protected in the duty of about \$1½ per ton, the *expensiveness* of our *inland navigation*, of 200 miles, not enabling them to compete with that, having an *ocean navigation* of 3000 miles to overcome, mostly brought to our ports as ballast. The good people of New York, on the other hand, think this duty sufficiently onerous, and often patriotically talk of urging its immediate repeal, to which they are provoked by the dearness and variableness of the prices of the home production, the causes of which they have not till now had fully explained to them, and which they had unfairly attributed to the extortion of the dealers, and to the large profits exacted by the miners.

Much is also said of the semi-bituminous coal from Cumberland, on the Potomac. The works necessary to effect a communication with tide water at Georgetown are yet unfinished, and may take two to three years to complete. But in anticipation of its coming we may here give an idea of what it will cost to bring it to New York, relied upon as a market for it.

Mining costs nearly the same every where, and with the etceteras to get it to a canal over a railway 11 to 12 miles long, it will cost, according to experience in Pottsville, say with a mine rent of 30 to 40 cents per ton, - - - - - \$2 00

Freight to Georgetown, over 186 miles canal, in boats of

75 tons, could not be afforded (their being no back freight,) at less than 1 cent per ton per mile, - - - 1 86

Toll to Georgetown, at 1 cent per ton per mile, - - - 1 86

Expense of handling, re-shipping, waste, wharf rent, etc., at Georgetown, - - - - - 48

Cost, shipped at Georgetown, per ton, of 2,240 lbs., - - - 6 20

Add 20 pr ct. to bring it to chaldron weight, or 2,700 lbs., - - - 1 24

Carried forward, 7 44

Brought forward,

7 44

Freight from Georgetown to New-York, (the ordinary rates from Richmond, a shorter distance, are 7 to 8 cts. per bushel,) say per chaldron 36 bushels, 7 cents per bushel, - - - - - 2 52

Liverpool ore coal sells commonly, afloat, in			
New York, per chaldron, at	-	- \$8 to 8 50	} \$9 96
Sidney coal sells commonly, afloat, in New			
York, per chaldron, at	-	- 7 to 7 50	
Richmond coal sells commonly, afloat, in New			
York, per chaldron, at	-	- 7 to 7 50	

If this estimate is correct, it cannot answer to bring this coal into the Eastern markets, unless a peculiarity of quality give it a claim to higher prices than other bituminous coals. Of the same description of semi-bituminous coal, there are also the Dauphin mines, only 8 miles above Harrisburg, and 94 miles from tide water, at Havre de Grace ; and the anthracite coals will obtain a stronger hold on the demand, when they are reduced in price, as they must soon be, from 6½ and 7, down to 5 and \$6 per ton, *afloat*, in the New York and Eastern markets. By adding \$2 per ton to those rates it gives you the retail prices for each sort from the coal yards in New York, and which can be saved by forwarding the coal in a condition to be delivered from the boats, as now done partially, but which by the railway would be carried on to a much larger extent, by the inducement of still lower prices.

A few boat loads, as samples, have lately arrived in New York of the Blossburg coal, a bituminous quality, from the Pennsylvania mines, but having 40 miles of railway, terminating at Corning on the Chemung canal feeder, in the State of New York, 270 miles of canal, and 150 miles of river to traverse before reaching New York, it cannot be sold there much under \$9 per chaldron to return cost and charges. Its best market will be along the above line through the State of New York. A special reduction or remission of 73 cents on the whole toll, has been made by the legislature of New York in favor of this coal.

The season 1841 will be an era in the coal trade, having commenced with all the old stocks nearly exhausted, and the two principal canals disabled and unable to open, the Schuylkill for two months and the Lehigh four months, after the usual time. These circum-

stances must operate before the year is out, to show the great saving to the public of *a more certain dependence* for the regular supply of this necessary article. The first arrival of Schuylkill coal in New York, of the season 1841, was on the 28th May.

No. 28.

Considering that railways were only fairly started in the year 1830, and have had to contend against much prejudice by failure in the earlier attempts, and this duly fostered by the rival and predominant interest of canals, their progress has been truly astonishing; and scarcely do we now open a newspaper without finding the announcement of some new project for one; which is greatly owing to the discovery, that they can be constructed for the *double* purpose of passengers and freight, of all sorts, light and heavy.

At the beginning of 1841, the number of miles of railway constructed in the United States and England, were as follows:

	Miles.
In England, completed lines, - - - -	1100
“ In progress, - - - -	1000—2,100
In the United States, completed lines, - - - ●	3332
“ “ “ In progress, - - - -	1707—5,039

In England, capital invested, \$288,000,000, average per mile \$100,000, principally of double track.

In the United States, capital invested, \$98,000,000, average per mile, \$18,000, single track, graded for two.

Most of the better roads in this country, lately constructed, cost from \$40,000 to \$45,000 per mile, exclusive of motive power, according as they were charged for the right of way, which is as high as \$10,000 per mile in some cases, while on the average it does not exceed \$2,000 to \$3,000 per mile. In England this is the heaviest item, and often costs as high as \$30,000 per mile. There they get the iron and labor cheaper, as a set off to which here, wood and masonry are cheaper.

No average of cost can serve for any guide, each line of road must be costly or otherwise, in proportion to the difficulties it presents. A great reduction, however, has taken place of late years by new devices in excavations of earth and rock, and some other

economies, by which the expense per mile is greatly lessened, and for two important roads, the New York and Erie and New York and Albany, the estimate is for the superstructure about 9,000 with an edge rail, and for road bed and right of way, \$18,000 to \$16,000, or together, between \$22,000 and \$25,000 per mile. It is only near the towns and cities that the right of way, in these instances, is estimated to cost any thing. It should be remembered, however, that in nothing can false economy be more fatal than in a railway.

No. 29.

It is of the utmost importance to both the canal and railway from the Schuylkill region, which comprises the best and largest portion of the two first coal fields, containing 155,200 acres, that it should maintain its ascendancy in the coal trade, to which it has the most natural claim. There can be no doubt that the railway, furnishing the cars at the mine, will be first served, and is able to deliver the coal the cheapest at tide water; which, combined with the Schuylkill canal being forced by it, into such a reduction of its tolls as will place the dealer in this region, even in using the canal, on cheaper ground than by any of the other rival canals, would alone seem enough to secure this ascendancy. But there is yet another strong reason for this security, which is, that *here* the mining is carried on by individual operators, or by companies, acting on the same principle, free and unincumbered, with *rival interests for carriers*; while the other regions opposed to them, are weighed down with heavy capitals, originating in *expensive avenues of their own*, which must be *principally maintained out of their own coal business*. This will be better seen by the following contrast:

Thus, the Lackawanna in coal lands, railway of 16 and canal of 108 miles long, has a capital invested of	- \$3,000,000
The Lehigh in coal lands, and railways 30 miles, and canal of 73 miles long, has a capital invested of	- \$6,000,000

And they can furnish but *one quality* of coal, the white ash, for *only eight months* in the year.

Opposed to these in the Schuylkill region, besides the *numerous active individual operators*, there are the two following companies, which are managed as individual concerns:

The Delaware coal company, at Pottsville, having a capital invested of - - - - - \$350,000

The Forest Improvement Co. at Schuylkill Haven, on the Mine Hill railroad, with 17,000 acres, capital of only \$150,000

And they can furnish *every quality* of coal, for *twelve months* in the year.

The last company is admirably fixed for doing a large business, and which they seek to do by renting their mines on the most moderate terms, and offering the miner every reasonable inducement, in other respects, to accept them; such as supplying the shantee for himself and family, opening the veins, furnishing family stores, etc., and facilitating contracts for the sale of his coal, by accommodations to dealers in Philadelphia, New York, etc., being backed in New York by substantial men, who own this valuable body of lands, and who desire only to hasten the exhaustion of their mines by a reasonable rent, but which it will take generations to effect.

The tract contiguous to the "Schuylkill valley railroad," in continuation of the main railway from the Delaware, lying almost in contact with that tract, is thus most advantageously placed for mining at all seasons, particularly in winter, which latter facility does not apply to all the mines; and it is, in consequence, sometimes heard from those thus placed, that the railway will not be able to deliver coal in winter; that there will be more difficulty and expense at this season cannot be disputed; but only let the facility of the railway be given, the difficulties will vanish and the coal will come.

Nor was the railway leading from Port Clinton to Tamaqua, 22 miles in length, now comparatively inoperative, made to remain so always, reaching as it does a most valuable body of white ash coal lands belonging as well as the road to the Little Schuylkill Coal Company, and to the Lehigh Coal Company. When enterprise and capital shall once more be enabled to see their way clear, this concern will attract attention, and relaying the present road suitably, to connect with that to Philadelphia, an advantageous investment could be made of it, and this said white ash coal, at the outskirts of the Schuylkill region, could then be got to market as cheaply as from that region itself. This road is also the cheapest avenue by which the Lehigh company can get their coal to market, particularly as it can be remodelled to admit of a very low rate of transportation, and which will be seconded by the main road, to which it will be a feeder.

Since then the WHITE ASH COAL is the quality which has to meet competition from different regions, it may be well to place them on a footing of the mere cost of production and transportation, and to show as near as may be, the best that each can do in the struggle for supremacy, in say the New York market, where the following costs place it *afloat*. This quality of coal, being less friable than the red ash, can be mined and handled at 50 cents per ton under the latter.

The smallest coal, known as pea, now sells at from \$3 to \$4, and even the dust will fetch from lime burners 40 to 50 cents per ton. But the wastage, on an average, of all the qualities of anthracite, requires a charge of 5 to 6 per cent. on the price, to cover the dealer, and is generally found not much under that rate on cleaning up a yard after a year's operations.

LACKAWANNA, OWNING THE AVENUE.

Their own statements, exclusive of mine rent, waste, interest on loans and capital, show the following cost of delivery at Rondout 90 miles above New York, on the Hudson.

	1839.	1840.
Mining, - - - 122,000 tons,	\$85 400	148,000 tons \$86 100
Transp. and repairs, 16 ms. railroad,	88 800	88 900
General charges, - -	46 600	36 300
	220 800	210 300
Freight, 108 miles canal, \$1.50 per ton,	183 100	\$1.37 per ton, 203 700
Repairs to canal, - -	102 000	73 200
	505 900	487 300
Deduct - - -	40 000	35 500
Freight received other than coal,	12 700— 52 700	8.300— 43 800
Interest credited, - -	122)453 200(3,71	443 500
	\$3 71 per ton, 1839.	453 200

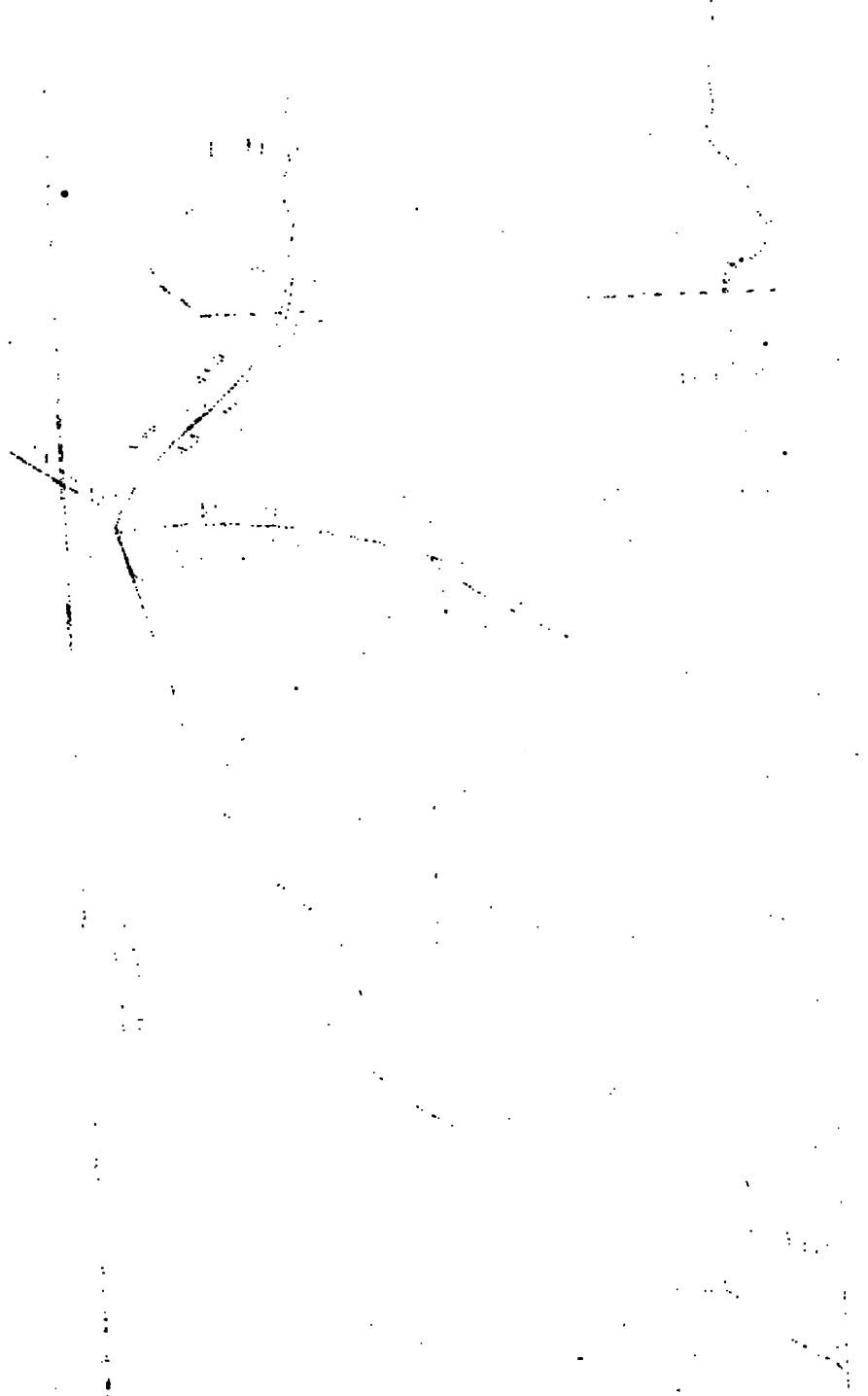
Cost per ton at Rondout, 1839, \$3.71 } aver. of 2 years on 270,000 tons, \$3.96, 700-3 32

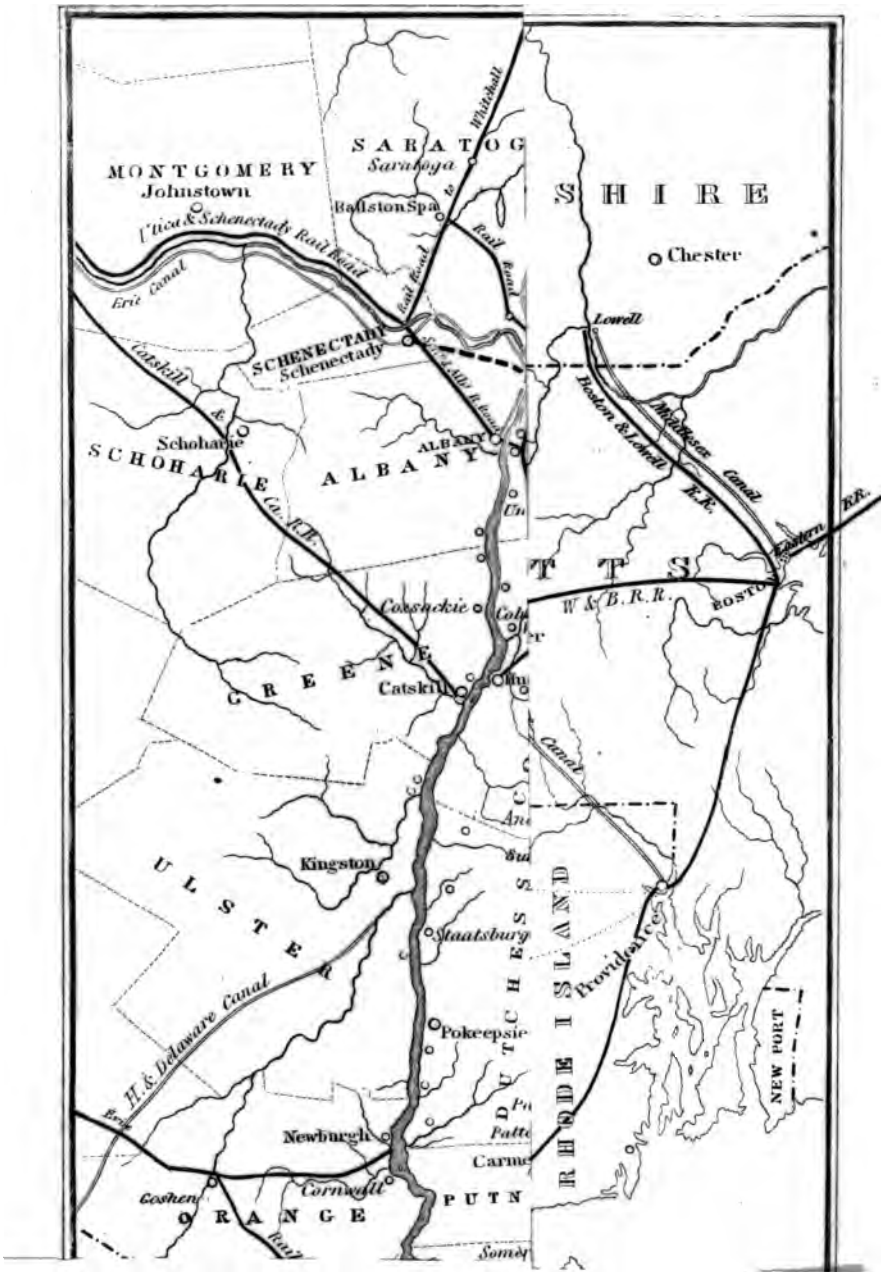
Cost per ton at Rondout, 1840, \$3.00 }

Freight and labor on coal, when sold deliverable in New York, - - - 50-3 82*

* The three first items in the above statements being greater in 1839, by \$10,500 on the lesser, than in 1840 on the larger quantity, is mainly accounted for by there being no item in the account for 1840 corresponding to the one in 1839 for "*expenses of steamboats and barges, \$3,687,*" applying to the quantity of coal brought from Rondout to New York, which in 1840 is said to have been on an increased scale. It is evident that if their expenditures for mining, transportation per railway, and general charges of 1839, are as competent to the delivery of the larger as of the smaller quantity, that the *annual per ton cost* of their coal, delivered at Rondout, must vary *materially*, besides its dependence on canal repairs and freights. Nor are these statements rendered the more intelligible by making *money balances* of their *supposed remaining stocks of coal*.

The interest paid by this company is \$55,540 on \$1,000,000 of loans, and their annual dividends have of late been 7 per cent. on a capital of about \$2,000,000, \$140,000, or together \$195,540 required to be earned beyond the above costs, which do not include mine rent, wastage, or any sinking fund for their works, as a guarantee to the *ultimate holders* of the stock and loans. All the white ash coals are so nearly of a quality that a consumer would not pay 5 cents per ton more for one than another. If the Schuylkill operators *think* themselves sufficiently remunerated at \$4 $\frac{1}{2}$ to \$5 per ton, *afloat*, in New York, as they should do, it will then be hard for the other regions to do much against them.





LEHIGH, OWNING THE AVENUE.

Cost of mining and delivering coal at Mauch Chunk, over a <i>nine mile</i> railway, excluding mine rent, waste, and interest on loans and capital,	\$1 50
Toll and freight to Bristol, say 103 miles,	1 95
Less allowance for receipts on canal other than coal,	15—1 80
Freight to New York, and labor at Bristol,	1 12—4 42*

SCHUYLKILL, INDEPENDENT AND RIVAL CARRIERS.

<i>Railway.</i> —Cost of delivering coal into cars of the railway at the mines, 10 miles above Schuylkill Haven, on the West Branch railway, yet a virgin district, and 5 miles below Pottsville, exclusive of mine rent and waste,	1 00
Freight to the Philadelphia and Pottsville railway, including 20 cents toll to West Branch railway, delivered on the Delaware,	1 70
Freight to New York from Richmond, on the Delaware, by steam power. (See page 21 of Sketch.)	80—3 50
<i>Canal.</i> —Cost of delivering at landings in Pottsville, over <i>one mile</i> railway, exclusive of mine rent and waste,	1 30
Say freight down the Schuylkill to Philadelphia,	90
Shipping charges, say loaded directly from boat,	40
Freight to New York,	1 00
Toll to Schuylkill canal,	20—3 80

In 1840 the Lackawanna delivered at tide water	148,000 tons.
“ Lehigh “ “	225,000 “
“ Schuylkill “ “	411,000 “
Total,	784,000 “

These statements are additional proof that the Schuylkill valley is destined to pass the bulk of the coal trade, and the dealer can there be free, by the railway, from interruption in winter, and from the vicissitudes and delays in summer, to which the trader by canals must be exposed. It will be seen that in the above competition, the railway is the only carrier fairly remunerated at present, although all, we trust, will ultimately prosper.

No. 30.

The construction of the New York and Albany railroad, 15 to 25 miles from the Hudson river, and running parallel with it, is

* Should the Morris canal be ever made navigable for 50 ton boats, as is now being attempted, the Lehigh landings at Mauch Chunk will be 144 miles, by canal, from New York, and allowing a freight and toll barely sufficient to maintain boat and canal, they could then deliver coal, by that route, in New York for about 42 cents under the above cost, or at \$4 per ton afloat, placing them nearly on a par with the Lackawanna. All the canals, it is seen, must first *sink their cost and that of their coal lands* before they can come near the *railway route*. The people are sure to profit in this contest, and should not despise the instrument, which will thus save them, directly and indirectly, some millions of dollars annually in money, besides adding immensely to their comforts.

about to be undertaken in earnest. That railways should pretend to contend against canals for freight, although that were considered presumptuous enough, was not so much wondered at; but that they should offer to compete in *any way* with the mighty Hudson, that truly great natural stream, in which the *auxiliary element* is found "without stint and without cost," is generally considered in New York as truly chimerical. Greater wonders than this, however, have been realized. Mr. Wood, for instance, the able editor of the "Practical Treatise on Railways," when it was advertised in England that a locomotive on the Liverpool and Manchester railway would be made to proceed at a rate of 15 to 18 miles per hour, interested himself to have the announcement suppressed, as being too absurd, and therefore injurious to the cause; yet Mr. Wood was, shortly after, carried himself at the rate of 40 miles per hour, and although the ground is much narrowed of late for equal progress, yet there is continued evidence of advances in one or other branches of the railway.

It is shown in note No. 11, that in the south, rivers using steam are being *deserted* for the railway. The same cause should have the same effect at the north. In one sense, for the freight from and to Albany and New York, during the season of navigation, it is not pretended that the railway would attempt to compete with the river, but in other senses *sufficient to warrant the work, it can do so effectually*, and its advocates are fully justified in urging both its importance and its *profitableness* upon the community. The following is a summary of the reasons urged by them in its favor, which it behooves every New Yorker to examine and fully to understand, as his decision, either way, must be fraught with important consequences to himself and to his posterity. (See report of the Common Council of the city of New York for 1840 on this subject.—Document No. 10.)

1. Authentic statistics show that apart from the river, on the *line* of the road, the tonnage now got to market at great expense, is at least 100,000 tons.

2. That the summer travel for eight months, in 1839, was 3,500 per day, exclusive of sloops and market boats, or equal to through passengers, *each way*, per day, between Albany and New York, 1,000.

3. That once the competition by railway was open, and the travel *divided* with the river, the number now crowded into each boat would cease, and the two conveyances would then carry about an equal number of through passengers per day each way, far more comfortably.

4. A steamboat, costing \$70,000, capable of accommodating properly the above number, would cost in fuel, wages, wear and tear, insurance, etc., about \$2 per mile, performing the trip, on an average, in 10 to 11 hours.

5. The locomotive and train, costing together \$20,000, capable of accommodating properly the same number, would cost in fuel, wages, oil, wear and tear, including *charge for repair of road*, 80 cents per mile, performed on an average in seven hours.

6. The following is the data upon which the above statements are made: first as regards the expense of running a steamboat on the North river. At present wood is the fuel generally used, but anthracite coal is being introduced with apparent present economy, but it is yet doubtful if it will be found so ultimately, the heavier boats, with large fire surfaces, not being able to dispense with the blower it is said, and which is found injurious to the boilers. Nevertheless, for ferry boats, tow boats, etc., the use of coal is increasing, particularly with those on the sound.*

Cost of boat \$70,000, at 7 per cent.,	- - - - -	\$4,900
Wear and tear, 12 per cent.,	- - - - -	8,400
Fuel, 220 trips, 40 cords per trip, 8,800 cords, at \$5 per cord,	- - - - -	44,000
Insurance on \$70,000, at 3 per cent., (their own underwriters generally),	- - - - -	2,100
Oil, tiller ropes, packing, etc.,	- - - - -	2,400
Wages, 1 captain, \$1,500; 1 2d captain, \$600; 2 pilots, \$800; 2 engineers, \$1,000; 6 firemen, \$960; 10 deck hands, \$2,000; steward, \$400; 12 assistant stewards, \$1,440; barkeeper, \$400, together	- - - - -	9,100
<i>Carried forward,</i>		<u>70,900</u>

* This has reduced the price of wood to \$4 per cord for Virginia pine, which used to sell at \$5 and \$5 50 per cord. The engineers of the boats to Albany say they consume about one ton of anthracite to every twelve miles, or twelve tons per trip, and which is delivered at about from \$6 50 to \$7 per ton. This would reduce the running cost of boat to \$1 20 per mile or a saving over wood of 80 cents per mile, unless counteracted by the quicker destruction of the boiler.

Brought forward,

70,900

Deduct interest on capital, to put it on an equal footing with the railway, - - - - -	4,900
Average trips per season of eight months 220, or equal to \$300 per trip of 150 miles, - - - - -	<u>\$66,000</u>

The above then, excluding interest on capital (wood costing five to six dollars per cord, and the consumption being equal to one cord to about every four miles), brings the cost of running a steamboat on the Hudson river \$300 per 150 miles, or at per mile \$2 00

On Lake Erie, upon data given by Mr. Klein, between Buffalo and Detroit, to and fro, 720 miles, (wood costing only \$1.50 to \$2 per cord, and consumption as above), excluding interest on capital, the trip round costs \$900, or - - - - - per mile \$1 25

A locomotive and train, equal to the same number of passengers per trip, (on an average of fuel, so important in either case), would cost, excluding interest on capital, but including an allowance for repair of road, which the steamboat has free, to be fully covered, say \$80 per 100 miles, or - - - - - per mile 80 cts.*

These comparisons then show most clearly that the actual running cost without allowance for interest on capital in any case, is less by railway, but particularly in the middle States, where wood fuel is the dearest, and performing more than the steamboat, it generally operates an entire saving to the traveller of the fare by the latter, of which we have the practical illustration given in No. 36, which shows that the railway is preferred at even a higher rate, where they run parallel.

* To accomplish the years business our trains have traversed (on an edge rail) a distance of 110,540 miles. Dividing the expense, \$67,282, by this, will give the average cost of working the road 60 8-10th cents per mile run.—J. E. Thompson's report, Georgia railroad, May 10, 1841.

In 1840, on the Utica and Schenectady railroad, with a flat bar, the business was accomplished by the trains having traversed 145,260 miles for \$119,900, equal to about 80 cts. per mile, the repairs to the road that year exceeding the preceding by \$13,000, or equal to nine cents per mile. Of course these fluctuations will occur, and will vary on different roads. A fair average for roads over 50 miles, with an edge rail, would be about 75-cents per mile run. which would include cost of transportation, motive power, and repairs to road and management.

It would, however, be best tested between New York and Albany, where it would be seen that *for the business travel* the railway would have the preference at even a higher fare, being enabled to return the traveller the same day after a respite of an hour or two at either end, which cannot be done by steamboats: the loss by which would be, to the business traveller, on an average, at least equal to a fare of \$1 50 to \$2 per trip. The railway would thus be a regulator of the steamboats, and without any jealous or rival feelings, they could arrange with profit to both, to accommodate the public with the choice of cheap conveyances, the immense travel in the season of navigation being sure to require both. Under the present system, the fare is very fluctuating, from three dollars down to one, the latter, however, only nominal, for besides the fifty cents for supper, the traveller finds also superadded, an extra charge of two dollars for a state-room, and from one dollar down to fifty cents for a berth, according as he may think fresh air indispensable to his comfort, or he has the choice of escaping these charges by exposure on deck to the night air. The dividends made by these steamboat companies are said not to be less than 25 to 30 per cent. per annum, and without a regulator may easily reach 60 per cent. per annum before long.

Compare this to the railway, affording a clean charge of two dollars, and a clear *undisturbed* delivery, in six or seven hours, without foregoing home fare, wholesome air, or suffering any loss of time, the latter often so invaluable.

7. In the winter the railway would of course be without opposition, and at \$5 dollars per head the traveller would then be *far better* accommodated than he is now at \$15 to \$20 in a winter trip to and from Albany.

8. A *night train* to *sleep* two to three hundred passengers, as on the Baltimore road, would always be *full*. Starting at 9, P. M. and *awakening*, after an uninterrupted rest, in Albany at about 6, A. M., would be admirable as compared with the steamboat, by which you now start so as to *sup* away from home, and are aroused at an inconvenient hour without rest and generally from a pestiferous pillow. This could, however, be occasionally resorted to by way of a change.

9. As already conceded, the tonnage on the river in the summer to and from New York and Albany may be yielded to the river, as it can there be carried from the enormous scale of towage at

about *twenty-five cents* per ton, while between those points on the railway, by *the limitation* of the *load* over the grade of 30 feet, the cost of transportation is enhanced 75 or 80 cents per ton per 100 miles. But for the greater portion of its length the road is ten to twenty miles *away* from the river, and for the *way freight*, provisions, and building materials, would be without a competitor. For a distance, also, of near one hundred miles, from a dense business point *in the direction of the trade towards the city of New York*, the grades are moderately descending, over which the cost of freighting, not exceeding 50 to 60 cts. per ton per 100 miles, would give the road an opportunity to attract much profitable business to it, skirting as it does the States of Connecticut, Massachusetts and Vermont, which would each furnish also their fair quota of way travel.

10. The construction of the railway, to realize all we have said above, and as a matter of pride to the State and city, should be of the *first order*. This we should say could be accomplished for four millions of dollars, which would allow for an edge rail of 56 lbs. per yard, and to be graded for two tracks for the 146 miles from Harlem river to Albany and Troy.

And how might this be contributed, with such evident advantage and honor to those who would embark in it? Thus we will say:

The State,

Make the road bed for 146 miles from Harlem river to Troy, contributing a loan,	
at 6 per cent. per annum, - - -	\$1,500,000

Residents on Line of the Road,

Furnish the right of way and depots, taking stock to the amount of - - -	400,000
--	---------

The City of Albany,

Contribute to the road in stock, say in the proportion of one-third of the amount agreed by them to be contributed to the <i>Boston and Albany railroad</i> - -	350,000
---	---------

The City of Troy,

Contribute sufficient in stock to connect that city with Greenbush, opposite to Albany - - - - -	150,000
--	---------

<i>Carried forward,</i>	900,000—1,500,000
-------------------------	-------------------

Brought forward, 900,000—1,500,000

The City of New York,

Contribute sufficient in stock for the cars,
motive power, and site for depots, - 600,000

The leading Capitalists of New York,

The superstructure, to be equal to the most approved and recent models in England as to solidity, etc. An opportunity is here presented for a *lucrative investment*, which would far outstrip in utility and profit that fine structure the Astor House, and would be the means of more widely extending the usefulness of the intended *munificent bequest* to the city of a PUBLIC LIBRARY, say - - - *1,000,000—2,500,000

\$4,000,000

The investment could be relied upon as yielding at least 10 per cent. nett dividend, on a capital of \$2,500,000, after paying the interest on the loan from the State, and every one would feel its collateral advantages in bringing to the city the northern and western travel at all seasons of the year, as well as greatly increasing its supplies of provisions. This subject in particular is worthy of investigation by a *special committee*, to be got up by the above parties, and its attention would also be worthily directed to the whole subject treated of in this work, as a means of refuting or verifying its statements, so important, when really based in truth, to the general interests of the country. By the 1st of November next the advantages to Boston of a connection with Albany, by railway, will develop themselves, for the especial consideration of the citizens of New York.

The tender of such a contribution as that which would furnish the superstructure should be the means of securing all the rest, and

* Of this sum, about \$600,000 would be required for the iron rails, a contract for which, at the present depressed state of the iron trade in England, could be obtained on the most advantageous terms, both as to price and mode of payment. The price for June, 1841, was per ton 8*l.*, lighterage 2*s.* 6*d.*, commission 3*s.* 6*d.*, freight 15*s.*, insurance 3*s.*, together 9*l.* 4*s.*, at \$4 80—\$44 16 per ton.

It is a curious coincidence that the same apathy should pervade the communities of New York and Philadelphia, in respect to works about equally vital to each, as the New York, and Albany, and Philadelphia and Pottsville railways. See Journal of Commerce of 23d June, as respects the first, which has, however, no immediate rival interests to shock like the second.

it would not be inappropriate, in that event, that the road be approached by a monumental arch, on which should be inscribed the NAME OR NAMES, of he or they, who would thus have started and inspired confidence in so *useful and necessary* a work.

As the main stem to the northern railroads, the saving and convenience to the winter travel would be immense ; and who, in looking ahead three years, in which time the New York and Albany railway could be put into operation, would say that it could then want profitable occupation, considering that the present enormous travel between those points will have nearly doubled, if there be any truth in the report of the owners of steamboats, officially made to Congress, which gave the average ratio of increase in that direction at 100 per cent. for each successive period of five years for fifteen years.

It is also in similar periods, or in cycles of five years, the whole population manifests its movement, which is scarcely perceptible in its progress from the ripple to the wave, but which then declares itself in the evident enhancement of all real values ; and although there will come intervals of overgrowth, which will debilitate it for a period, yet the elastic energies of such a population are sure ultimately to recover it from all adverse pressure. It is now performing a reaction of this sort.

No. 31.

It is not to be expected that the collateral advantages of improvements of any sort are to have much influence in promoting their construction, the majority only recognizing that which touches them *directly*. But they are of no small importance, and should be better understood than they generally are. It is among our eastern friends that they are most fully appreciated, and their testimony on such points, as close calculators, is always valuable. Thus they say :

“ That it cannot be doubted that a railway, by economy of time saves three-quarters of the labor and expense of transporting burthens and persons. At a low estimate for Massachusetts this expense is calculated at 16,000,000 of dollars, of which 12,000,000 per annum could be saved. Every month's delay is, therefore, a shameful waste of 1,000,000 of dollars.”

So reasoned these far-seeing people, who have now the practical demonstration that such is the effect of the railway ; but it is not elsewhere so generally recognized, even among the more intelligent. If, indeed, it were practicable to withdraw the railway their advantages would then be brought immediately home to the people, who would quickly feel their condition, without them, to resemble most nearly that of "fish out of water."

No. 32.

As further illustrative of the advantages of long lines of railway, and as affording some other useful views on the subject in general, we offer a summary of the report of the New York and Erie railroad, now in progress, and which it is calculated can be maintained from the *way travel and business alone*, leaving that obtained at either termination for the *whole line* as profit, and ample after paying interest on State loan to give the stockholders a liberal dividend.

The distance from Dunkirk, on Lake Erie, to *Piermont*, on the Hudson, is - - - - - 446 miles.
The distance from Piermont to New York is - - - 22—468 miles being the whole distance. The track is six feet wide, with an edge rail of 56 lbs. per yard, and for nearly two hundred miles is built on piles. It is intended to finish it in 1845, at a cost of \$9,000,000, of which the State, by the present arrangement, is to furnish \$6,000,000 and the stockholders \$3,000,000. If it can be completed for \$10,000,000, it would still be a cheap road, and that sum need not be exceeded, if the contributions along its line, in right of way, labor, etc., are carried out.

Taking as some guide the business on the Erie canal, through the northern tier of counties, with a population per last census of seven hundred thousand, they seem with good reason to rely upon the way travel being ample on this railroad to support it, the southern tier of counties, through which it passes, being calculated to have a population of about one million when the road shall be finished, in 1845. To the north on the Erie canal, in 1839, the whole traffic was as follows, and which must increase annually:

162,500 tons mdz., of an average value of \$280 per ton	
500,500 " manufactures, flour, etc., do. 125 "	
764,000 " lumber, coal, etc., do. 51 "	
<hr/>	
1,426,000 tons, total estimated value, - - - -	\$73,400,000

On the above 1,426,000 tons there were
paid in tolls to the canals, - - - \$1,500,000

On the above 1,426,000 tons there were
paid in freight to forwarding men, - 4,500,000

The travelling consequent on this business
per annum, is estimated to cost - - - 3,000,000—9,000,000

The railways on the line of the Erie canal derive nearly one half of their whole receipts from the *way travel*, although the canal takes a good portion of it, and in respect to freight, they are not allowed to carry it, although offering to pay the canal tolls. The travel is here found, for short distances, to be as two to one compared with that for long distances.

Now, on the line of the Erie railroad, with an estimated population 30 per cent. greater than along the Erie canal, there would be neither competition nor restriction like the above, nor is there any reason for supposing a difference in the wants and business energies of the two populations, only that the former would be more stimulated by an improvement affording greater facilities, and which would be the certain means of drawing along its line, in preference to going to the far west, a fair share of the large daily influx of emigrants from Europe, who would there find cheapness and fertility, without letting go their hold on civilized life.

Of the tonnage on the canal about one half is of a value to seek a railway in preference, by which it would only be two to three days from the emporium of the States, instead of eight to nine days as now by canal and river.

It is intended to work this railway by sections of eighty miles each, adapting the weight of the locomotives to its varying grades, which are as high as sixty feet per mile for short distances.

The present mixed route to the lake, by river to Albany and thence by railroad, is as follows:

From New York to Albany, by the Hudson river, 147.

From Albany to Buffalo, by railroads, 390.

467 miles,

or the same distance as by the entire railroad route terminating at Dunkirk. With a railway to Albany, to obviate the closing of the river in winter, New York would then be doubly armed against any undue diversion of trade from her by the connection of Boston with the same points.

Having thus adverted to the different routes to the lakes, it is next of consequence to understand what are the expenses of transportation by those at present available, and to compare them with the rates which would remunerate a railway, say either the New York Albany and Buffalo, or the New York and Erie, the latter having rather a more open port at Dunkirk than the canal or railway at Buffalo. The cost of transportation on these railways, for four hundred and sixty-eight miles, would be rather under \$4 per ton, calculated at 80 cents per mile, and on a nett load of 100 tons, so that these companies could well stipulate to carry at the rates affixed below, on condition of their roads being carried through forthwith, by which some millions of dollars could be saved annually to the public on the best portion of the one and a half million of tons now carried over the canal and river, besides the gain in time of at least a week per trip, and operating all the year round.

STATEMENT.

ARTICLES.	Lake Erie to New York.		New York to Lake Erie.	
	From } 150 ms. by river, Buffalo, } 363 " by canal, 613	From Dun- kirk, by railway, 468 miles.	To Buffalo by river and canal 513 miles.	To Dunkirk by railway 468 miles.
	Freight and toll per ton of 2200 lbs.	Freight and toll per ton of 2200 lbs.	Freight and toll per ton of 2200 lbs.	Freight and toll per ton of 2200 lbs.
Flour,	87½ cts. pr bbl., or \$9 62	67 cents per bushel or \$7 87		
Grain,	25 cts. per bush., or \$10	20 cents per bush. or \$8		
Provisions,				
Ashes,	45 cts. pr 100 lbs., or \$9 90	37 cts. pr 100 lbs. or \$8 14		
Seed,				
Furs & skins,	\$1 per 100 lbs., or \$22	75 cents per 100 lbs. or \$16 50		
Light goods,	- - - - -	- - - - -	\$1 30 per 100 lbs. or \$28 60	60 cts. pr 100 lbs. or \$13 20
Heavy goods,	- - - - -	- - - - -	95 cts. per 100 lbs. or \$20 90	55 cts. pr 100 lbs., or \$12.

The above rates on light and heavy goods are those of 1840. In the present season of 1841, in consequence of the competition through the Oswego canal, Lake Ontario and Welland canal to lake Erie, they have been forced to carry at 70 cents for light, and 60 cents for heavy goods per 100 lbs. on the Erie canal; but these rates are *admitted to be ruinous*, which therefore settles the question of the railway being the cheapest, as at those rates it would be well paid. Thus the canals should be bound to carry at, or in view of the loss of time by them and other losses sustained by the public in foregoing the railway, *under* the rates at which the latter would stipulate to do the business, as the only real test of their being cheaper carriers—otherwise to the favoritism now shown to them in the State of New York, will be added the vilest monopoly.

By the present mixed Pennsylvania route from Pittsburg to Philadelphia, 348 miles, the charges for 1841 are stated to be :

Flour, \$1 25 per bbl., \$13 75 per ton of 2200 lbs.	By the <i>Middle route</i> of railway \$9 00 pr ton would pay.			
Cotton, 56½ cts per 100 lbs., \$12 37 per ton of 2200 lbs.	do.	do.	\$10 00	do.
Provisions, 62½ cents per 100 lbs., \$13 75 per ton of 2200 lbs.	do.	do.	\$8 00	do.
Tobacco, 62½ cents per 100 lbs., \$13 75 per ton of 2200 lbs.	do.	do.		
			8 00	do.

From Philadelphia to Pittsburg the rates for 1841, are about 18 to \$25 per ton on heavy goods; on fine goods, 28 to \$30 per ton.

The charge for light freight at \$28½ per ton, in 1840, per Erie canal, is called and passes for cheap, but at \$14 per ton by a railway, it would pay better and be *cheaper*, and thus only by presenting a later and improved standard, can the public escape being mystified, and be enabled to see, that canal transportation is only cheap, as compared with that by the horse wagon or the ox team.

It should not be overlooked that the Erie railroad passes through Olean, at the head of the Alleghany river, which will in time connect it with Pittsburg and the Ohio valley, the intention being to improve that river for a steamboat navigation.

What then is the *mere cost* of freight by river and canal, and by railway only, to the lake, without toll or profit in either case?

By river.—150 miles, freight and towage per ton by canal boat of 50 tons, (only about 25 cts. pr ton by the large tow barges of 3,500 bbls.) 62 cents.

By canal.—363 miles, at one cent per ton per mile, average time of trip to and from Albany and Buffalo 16 days, and longer while the enlargement goes on - \$3 63—4 25

Railway.—468 miles by railway, in 50 hours to Dunkirk, would cost, at 80 cents per mile and load of 100 tons nett, \$3 72

But put them at the same cost of freight, (although the canal boat must be further liable to a toll at least adequate to maintain the canal,) and the railway would have the advantage of a week in time of delivery, and an earlier navigation at Dunkirk, which on many articles would be equal to the whole charge by canal.

The toll is a charge distinct from the freight, and appertaining exclusively to the canal and railway, necessary first to cover repairs and maintenance; and secondly, interest on cost and a fair profit, to accomplish which, the charge should vary with, and be regulated by, the amount of tonnage passing over the improvement, as illustrated by the two following *extreme*, but real cases among canals:

Erie and Champlain Canal—

Cost \$8,500,000, 440 miles, interest

7 per cent., - - - - \$595,000

Repairs and maintenance, for 1840, 364,000— 959,000

Passes 1,400,000 tons, on which, to repay the above, an average toll is required for the whole distance of per ton, - - - -

cts. 68½

Tide Water Canal on the Susquehanna—

Cost \$2,800,000, 42 miles, interest, \$168,000

Repairs and maintenance, - - 42,000— 210,000

Passed 70,000 tons in 1840, on which, to repay the above, an average toll is required the whole distance of per ton, - - -

\$3

Any charge exceeding these rates which are mere *toll* independently of *freight*, would be profit over and above the interest on the capital and current expenses. The Tide Water canal received \$35,000 in 1840, and therefore the average toll for the whole distance was 50 cts. per ton. On minerals it is restricted to one-half cent per ton per mile, or twenty-one cents for forty-two miles, and is not allowed to regulate the charge on the standard of repaying interest on repairs, costs, etc., even if competition permitted, and thus, as adverted to in note No. 7, have canals been *made to pass for cheap*, greatly to the disadvantage and just progress of railways, by being obliged to consider in most cases, their first cost as sunk.

IT COMES TO THIS, THEN, THAT THE RAILWAY IN MOST CASES, CAN CARRY MERCHANDISE AT OR UNDER THE COST OF FREIGHT ON A CANAL, AND IS (WITH PERHAPS THE EXCEPTION OF THE HUDSON RIVER) AS CHEAP ON ALL OPEN RIVER AND BAY NAVIGATION USING STEAM, AND THAT THEREFORE, ANY CHARGE FOR TOLL BY CANAL, WOULD BE ONLY AN ADDITIONAL BOUNTY IN FAVOR OF THE TRADE SEEKING THE RAILWAY, WHICH BESIDES, NEVER SUSPENDS ITS OPERATIONS, AND HAS A GREATER DESPATCH AND CERTAINTY OF ARRIVAL, THAN EITHER OF THE OTHERS.

The objection to the apparent disparity in the amount of capital required for the railway more than for the steamboat, is met by the former doing more for passengers, combining the carriage of freight with them, working four to five months longer in the year, being a less perishable property, and requiring no insurance like the steamboat, which together bring the two, on the score of capital, at least on a par.

Looking upon the New York and Albany and New York and Erie railroads as adding to the useful and beneficial links in the great chain of the Union, a mixed physical and moral bond to it, they have had our hearty advocacy, and in framing these notes, in respect to them, we have endeavored to make them unanswerable commentaries on the superior cheapness and more general utility of the system itself, to which in due time the most sceptical will yield. The subject, indeed, is worthy of the special investigation we have before alluded to, and as the country generally is now making its observations for a fresh departure, it would be well not to start unprovided with correct views on the important item of internal *improvements*, which will be found almost indispensable, among the

other means necessary to preserve it in a true and steady course for the future.

No. 33.

The safety of railway travelling is now fully admitted, and is, indeed, of daily proof. Much noise is always made on the occasion of the least accident by them, which, although it may alarm unnecessarily, in being thus blazoned forth, it is useful in adding to the vigilance in their management. How often do we hear of the engine being knocked off the track, without even injury to those on her, which says much for the control obtained over this apparently indomitable machine. The accidents at any rate are not very numerous, considering the great scope for them, and in nearly every case, the harm rarely reaches the passengers, being confined mostly to those on the road or in charge of the trains. Some casualties in the last year in England, on *unfinished lines*, caused for a time much sensation, but on all those completed, the testimony is most abundant as to their safety. Thus the *Railway Magazine*, for 1841, after going over the details of accidents on the several roads, in England, comes to the following summary :

“ We repudiate all accidents which the drunken or headstrong ways of men, violating orders and rules, bring upon themselves, and then the account will stand thus, that with two hundred and fifty-six millions of miles travelled and fourteen millions of persons carried, only two fatal accidents have occurred from the railway system.”

It is evident that the liability to accident, is far greater with the steamboat, in any location, but on the western waters the frequency of wreck and accident, must ultimately induce the construction of railways wherever it can be suitably done.

No. 34.

In order more fully to explain why the Philadelphia and Pottsville railway should find so little favor, in Philadelphia particularly, we will enumerate some of the works to which it would be a most serious interference. It might perhaps have been smothered in the birth, but that the idea, at that day, of a railway competing with a canal in the carriage of coal for *such a distance* was only matter for laughter. It was, therefore, scarcely regarded at all, until within a

year or two it put forth its pretensions as a competitor in the transportation of this mineral, which many, however, still believe is only meant as a *joke*. See the rise and progress of the Stockton and Darlington railway, as given in a late Leeds Mercury, how far and how soon the anticipations in regard to the effects of a comparatively inferior coal railway, may be outstripped by the reality.

Works, for all of which, this railway would answer as a substitute for many years to come.

Lehigh canal, - - - -	\$6,000,000
Beaver Meadow, Hazelton, etc., on the Lehigh, - - - -	1,500,000
Morris canal, - - - -	4,000,000
Delaware division of State works, - - - -	2,500,000
Delaware and Hudson canal, - - - -	3,100,000
Columbia railway, - - - -	4,400,000
Lancaster and Harrisburg railway, - - - -	800,000
Norristown railway, - - - -	800,000
Little Schuylkill railway, - - - -	900,000
Valley railroad and West Philadelphia, - - - -	1,000,000—25,000,000

Works in immediate contact with the present railway and contemplated branch to Harrisburg. Besides serving for the coal trade, these are useful works in the western trade of Philadelphia, and would be more so if of uniform size.

Schuylkill navigation, 54 tons, - - - -	3,800,000
Union canal, 25 " - - - -	2,200,000—6,000,000

Wharf property on the Schuylkill front of Philadelphia, (some of the largest capitalists in Philadelphia, here find a reason for the *folly* of the Philadelphia and Pottsville railway,) - - - -

2,000,000

\$33,000,000

A specimen of the temper in which the public feeling is kept on this subject, may be best recorded by giving the following extract from the letter of a Philadelphia correspondent of one of the New York papers, communicating, in a tone of triumph,

the *fancied failure* of a recent attempt of the company to obtain a loan.

"It is much to be doubted whether, with all the assistance the Bank of the United States might have given them in her best days, the road would ever have been completed, and now it is *reduced to a certainty* that the road beyond Reading to Pottsville must be abandoned. *The whole project is the result of a greedy, envious spirit, which pervades the country, and which cannot see one enterprise prosper, without trying to supersede it by another.*"

It does not in fact concern the public, in what motives any enterprise may originate, nor with what is so inscrutable, is there any certainty of a right imputation. It finds at last that these rivalries of particular interests result favorably for the general good, and that as the most active germs of improvement, there would be without them, but little progress and few facilities in the world. When this now obnoxious railway, therefore, shall have established itself among these, the public will rather congratulate itself upon the *lucky ignorance* which saved it, than be anxious as to how it was begotten, or afterwards struggled into usefulness.

We would here allude to two important improvements about to come before the public, which will contribute materially to the economy of railways :

Gardiner's truck, for locomotives and cars, which completely obviates the resistance and danger from short curves, and adapts itself to the shortest in a manner to effect all the advantages of a perfectly strait road, which on one, destined to have the large business of the Philadelphia and Pottsville, will be incalculable. It has other minor economies, and for roads in prospect, will be a great saving, by rendering unnecessary the great expense in avoiding curves, which are thus deprived of their resistance.

A new saw mill, which promises to give 12,000 feet of common pine board per day, in place of 3000 feet, the maximum yield of those now in use, and the boards are turned out by a peculiarity in the saw, smooth enough to receive the paint, thus doing away with the necessity of planing, in all ordinary cases. It comes very opportunely for railways, by reducing materially the cost of their wooden structures and lessening the charge for renewals.

The mouth of the Susquehanna, on the Philadel-	
phia side, is contemplated as a site for this	
saw, where the logs could be bought for	- \$4 00 per M feet.
Sawing per 1000 feet,	- 0 50
Transportation to Philadelphia per ton of 1000	
feet seasoned timber,	- 3 00
	<hr/>
	\$7.50

delivered in Philadelphia, where the average price of pine boards is 17 to \$20 per M feet. The calculation is, that sills for railways could be furnished at 20 cents per sill by this process, and the wood for bridges at a greatly reduced cost.

These are two of the very last improvements, and mistrustful generally of pretensions on this score, before being fully tested, we really believe in the genuineness of these. The PEOPLE of the world have in fact now got to see clearly the advantages of this sort of rivalry, and of a mutual interchange of their ingenuity, which can never be too successfully exerted, as even in objects of destruction, the more terrible they can be rendered, the greater the security for peace, without which, all its other fruits would be comparatively worthless. It was the philanthropic purpose of FULTON, by his torpedo, to scare mankind into this christian path, and since, so much has been done with the same desirable purpose, that combined with the results of steam power, so gloriously associated with his name, the duration of wars will be greatly shortened, if they are not altogether prevented. Every new invention, at least, thus interchanged by the nations, their PEOPLE being now the arbiters, can only dispose them the more, against this barbarous alternative. The inventive faculty, therefore, can scarcely ever be misapplied, and we hope it will always be encouraged to work round in an endless circle of good.

An official statement has lately appeared in reference to the Columbia railway (a mystery thus far to the public) which we shall endeavor to put into as intelligible a form as possible.

Having been originally intended for horse power much of its track has had to be re-laid. In following up the improvements in the locomotive it has become saddled with a great deal of imperfect

machinery, operating over a road never the best, and its very irregular business, coming by fits and starts, required a very heavy establishment of it. It had till lately two inclined planes, but that at Columbia has been avoided, leaving it the annoyance of the one at Philadelphia. This plane, although not so very expensive in itself, is the cause of much delay, and together with the late resort to horse power over the bridge, which crosses the Schuylkill, are serious impediments to the economical and successful conduct of the business of the road.

If the severest discipline is any where indispensable, it is in the management of a railway. The absence of it can only be the fruitful source of failure and loss. Under the present superintendent, Mr. Tustin, late a practical forwarding man, a reformation in that particular is apparent in the greater neatness and order visible about the road, and in no department will its good effects be shown to have been more wanted than in that of machinery, now in charge of Mr. Sino, a first rate mechanic, and late foreman of Mr. Norris' locomotive establishment, to whom we are indebted for much *practical* information in regard to railways, and who would be a very *proper person* to consult on the different effect that could be produced in working a road like the Philadelphia and Pottsville railroad, and that of which he has charge of the principal department. Neither of these gentlemen we believe are *politicians*.

The original cost of the road for 82 miles and turn-outs is given at	-	-	-	\$3,705,500
Expended in avoiding inclined plane at Columbia,	-	-	-	234,500
The repairs to the road are given in a lump for six years, at \$613,500, but of this there belongs of right to re-construction and the capital in the road,	-	-	-	367,500— 602,000
Average \$52,500 per mile,	-	-	-	4,307,600
Invested in locomotives,	-	-	-	445,600
Cost of road, 82 miles with motive power,	-	-	-	<u>\$4,753,200</u>
The receipts in six years, ending in 1840, are stated for motive power,	-	-	-	825,000
The receipts in six years, ending in 1840, are stated for tolls,	-	-	-	1,160,200—1,985,200
The expenses in six years, ending in 1840, are for motive power,	-	-	-	869,000

Carried forward,

Brought forward, 869,000 1,985,200

The expenses in six years, ending in 1840, are stated for repairs to road, at \$613,500, of which \$367,500 are charged to re-construction, and the remainder to repairs proper, or		246,000—1,115,000
Equal, on a capital of \$4,300,000 to $3\frac{37}{100}$ per cent. per annum for six years,	-	870,200
Add thereto the estimated profit of forwarding men on the average business of the last six years,		
Say 70,000 tons merchandize, at \$1 50 per ton, making 105,000 per annum for six years,	-	630,000
Say 60,000 passengers, nett profit at \$1 25 each, making 75,000 per annum for six years,	-	450,000—1,080,000
Equal, on an average capital of \$4,300,000 to $7\frac{1}{100}$ per cent. per annum, on the business of the road,	-	\$1,950,200

By referring to No. 8, it will be seen that at the scale of business there assumed, this road could be made to yield on its whole business a nett income of \$450,000, or 9 per cent. on a capital of \$5,000,000.

If any useful inference is to be drawn from the experience on this road, it is that "integrity of management," *in all its meanings*, is indispensable to the *full success* of the railway; and we may congratulate the "Philadelphia and Pottsville," that among its many advantages, this is to be a *leading* feature, and its business motto should be "*one and indivisible*."

No. 36.

The New Jersey railway, from Jersey City to New Brunswick, 34 miles, shows the advantage of way travel and low fares on a comparatively *dense population*. From its statement of 22d February, 1841, we extract as follows:

The cost of the road (including \$353,000 for right of way,) and motive power, etc., \$1,951,600. It has been in partial operation *for some time*, and was opened to the Philadelphia travel on 1st of

January, 1839. The highest grade on it is twenty-six feet per mile.

Gross receipts in 1839 were	\$233,700	Expenses in 1839,	\$110,800
" " 1840 "	203,100	" 1840,	116,700
	<u>\$436,800</u>		<u>\$227,500</u>
Average of expenses on gross receipts equal to - 52 per ct.			

Through passengers in 1840, at \$1,	79,300	} Gross receipts, \$203,100.
Way passengers between Newark and New York, - - - - -	215,700	
Way passengers between all other places, - - - - -	108,090—323,700	
Merchandise, tons, - - - - -	5,300	

The way travel amounted to nearly two-thirds of the gross receipts. Its influence on the meat market is most salutary—it has frequently delivered in one train from New Brunswick in two hours 50 to 60 head of cattle that are scarcely sensible of a change of place, while by boats they are worried out of at least 8 per cent. of their fat, and arrive otherwise unmarketable.

The first six months of 1841, show a rapid increase of travel on this road, attributable, no doubt, to the great despatch and accommodation which is there found by the public. The low fares are here also very operative, and during the holiday week, embracing the 4th of July, near 10,000 people passed over the road at an average charge of only 30 cents per head. Prior to this convenience, its line was comparatively a desert. It is much to be regretted that it should be intercepted near midway between two such important terminations, and should be subject to the *disadvantages of a short line*, its present equipment for 34 miles, answering nearly for the whole distance to Philadelphia of 87 miles. With the practicability of getting through this distance in 4 hours easily, full in view, it is hard that people are obliged to be quiescent under the present 7 hour system.

It may, however, in the meantime, be confidently expected that the way travel will meet all the expenses of the road; and as they have now temporarily arranged with the Camden line, for a more equal participation in the *through travel*, this source will no doubt in future give fair dividends to the stockholders.

The falling off in receipts in 1840 was owing to interruptions occasioned by the burning of the long bridge over the Hackensack; this and some other disasters by freshets to the turnpike bridges which they have to maintain, obliged them to intermit the dividend at the beginning of 1841.

Some competition is still maintained by the steamboats to New-ark and New Brunswick, charging to the latter place, 40 miles, $12\frac{1}{2}$ cents, while by the railroad, 34 miles, at 75 cents, it gets the majority of the travel, and the boats scarcely maintain themselves. The road would have conceded to them the freight between these points, but disagreeing, they have now put on a line leaving Brunswick early in the morning, which brings the market truck to the city two or three hours before the boat, and enables them to return in the evening at 5 o'clock, the passage money being 25 cents for both ways.

The competition between a railway and a steamboat line is here found under so near a parity of circumstance as to make it a fair contest, and the result is decidedly in favor of the former, to which we may well refer in support of the ground taken by the projectors of the New York and Albany railway, and which we have detailed in note No. 30, as to their ability to contend successfully against steamboats on the Hudson river, so as at least to compel them into a rate that would be mutually advantageous, and at the same time be an accommodation to the public. The business will be quite ample for both on this constantly growing thoroughfare.

No. 37.

As a record of the first essay in this country of the Ericsson propeller on the ocean, we copy the letter from the pilot of the *Clarion*, Capt. Dunn, owned by the Messrs. Glovers, bound from New York to Havana, being 225 tons burthen, with an engine of 70 horse power.

"TO CAPT. J. ERICSSON :—

"The *Clarion* left pier No. 1, North river, at three minutes past two o'clock, and I left her at 10 minutes to 5 o'clock, Sandy Hook Light House, bearing west two miles—distance sailed, 21 miles in two hours forty-seven minutes, or $7\frac{1}{2}$ miles per hour, without canvass, against a head wind and tide, with occasional snow squalls.

"Very respectfully, etc.,

"*New York, 15th April, 1841.*

JOHN TURNURE, Pilot."

The machinery and fuel occupy so little room that it may well be styled a "*Pocket Steam Power*," and it is to be hoped will prove a valuable auxilliary to sails in ordinary vessels.

Its utility, however, will be more particularly felt in small rivers, and on such canals as are of *a capacity* to admit of its profitable application. No avenue can be found more suitable than that between Philadelphia and New York, consisting of 67 miles of tideway and 43 miles of canal through the Delaware and Raritan, a barge of 200 tons, the requisite power for which Mr. Ericsson estimates at 16 horses, calculated to consume about five tons anthracite coal, *going and coming*, or for 220 miles, the speed being six miles in the tideway, and three miles in the canal, accomplishing a trip easily in less than a week. The despatch thus obtained with *so large a load*, must secure great economy in transportation, and the constant power of locomotion with the use of the engine for unloading, particularly with coal, in the *bay and vicinity of New York*, will together be of great advantage.

That this improvement is already appreciated, we may add that Mr. Ericsson has orders for three of his propellers for the Rideau canal, of large capacity, connecting Kingston and Montreal, also one for Oswego, to ply on lake Ontario through the Welland canal.

Another invention more particularly applicable to war steamers, is announced by C. M. Keller of Washington City, which places the paddle wheels under the vessel, and will probably be modified into something useful in the way of transportation.

No. 38.

As the great ligament of our Union, the railway is deserving of every consideration, and in this light seems most particularly to invite the fostering care of government, if the constitution oppose no obstacle.

At all events, the transmission of the mail is enjoined as one of its duties, the essential requisites in which are *despatch* and *punctuality*, the two very properties most prominent in the railway.

In thus ministering to our domestic peace and happiness, it will not be less effective in keeping off foreign aggression, and with its many other advantages to the public, should render it an object of

the attention and protection of the General Government. If this can be extended to steamers on the ocean, in conformity with the example now set by other enlightened nations, and which Congress are likely to follow, it will apply to railways also with equal force. But whether to the one or to the other, or to both as it should be in fairness, it is **THE MOST CHEERING EVENT OF MODERN TIMES**, that the millions which have hitherto, and are now wasted in preparations *to await war*, and which are forever eating out the substance of the people, should thus, in part at least, be applied to these humanising purposes, and into the means thereby, of counteracting any such savage resort.

We will therefore, merely put the question under these general views, whether it would not be within the competency of the post office department, to aid in carrying out main and important lateral lines of railway, by a loan of their bonds, the annual interest on which, would be equal to the rate per mile which would otherwise be annually incurred by this department, the consideration being the perpetual right for the mail, with such other privileges, as might be agreed upon, such as transportation of troops, etc. Thus, during a period of great depression of private and corporate credit, could the government be made to assist in making it available, at the same time that it served itself, or in other words, the public. As connected with the security and celerity of the mails, and other matters, this subject might be greatly enlarged upon, and in particular we might refer to the discourse of the "Rev. Mr. Dimmick on the Moral Influence of Railways."

We had proceeded so far, when the Report of Mr. Granger, the Postmaster General, reached us, in which he alludes to railways as being exorbitant in their demands for carrying the mails, etc., etc., while he had made advantageous terms with stage coaches. We should regret very much if such a charge can be substantiated against these companies.

It is the tone, however, in which this charge is preferred, that we cannot reconcile with the liberal spirit, which is due to the relative importance and value of this improvement, but particularly from a functionary of this *enlightened* Republic, and is the more mortifying as it contrasts so unfavorably for us, with the generous course adopted towards it by the *more benighted* European governments. The reports on this subject by Counselor Northumb, Minister of Belgium, could here be studied to much advantage.

In a table of comparative cheapness, note No. 14, we gave it as cheaper at \$500 per mile per annum for the carriage of the mail by railway, on main lines, than by any other known means of effecting the same objects for those who pay it, and the rate fixed by Congress therefore, at \$300 per mile per annum, was about fair to all parties. In England, by the evidence laid before Parliament, it appears that \$600 per mile per annum is paid on main lines, such as the London and Birmingham, and that it is there estimated as a general rule, to be worth \$400 per cent. more for the carriage of the mail by railway than by the ordinary means.

The railway and other modes of transit are indeed, scarcely comparable. The first is a fixture of immense cost and immense benefit, requiring 3 to \$4000 per annum per mile to keep it going through all vicissitudes, while the stage coach and steamboat, divided into small and detached capitals, can be either transferred or laid aside when not wanted. The railway, as we have here been pleading, rather requires the favor of government, than able to show it any.

Mr. Granger was lately enabled to send the President's message from Washington to New York, 220 miles, in little over nine hours, and to Boston, 440 miles, in 22 hours, while his predecessor, Benjamin Franklin, Postmaster General in 1755, could only boast of having so expedited the mails as to have obtained in winter, answers to letters between Philadelphia and Boston, 317 miles, in three weeks, in place of the then usual time of six weeks.

And again look at it in this light. A National Fiscal Agent is likely to be pronounced by a majority of Congress, as *indispensable* to the regular action of the government, and to the permanency of the currency, which, circulating and representing the earnings of the people, touches them the nearest. But constitutional scruples, and local jealousies, as to the site of the Mother Bank are insuperable difficulties to its establishment. These are all removed by selecting the seat of Government, and we put it to the candid, whether such a selection, the only compromise by which a boon, thus deemed indispensable, could be secured to the people, would not be almost nugatory, if not utterly worthless, under the old means of intercourse.

Now, however, space is so annihilated as to destroy many of the natural advantages of locality, and which have disappeared or been

greatly modified in many instances without its being as yet much noticed. The most efficient and potent auxiliary to a Fiscal Agent is in fact the railway, and if the seat of Government were connected by it with New Orleans, as it now soon will be with Portland in Maine—so central a locality for the *Mother Bank* as Washington, would if any thing, be preferable to all others—and whether assisted or not by the Government on these public grounds, this southern connection will in time become too indispensable not to be effected.

No. 39.

It has been too common, with otherwise intelligent men, instead of judging the railway by its *comparative success* to decry it on the slightest impediment, and rather in their estimate of it, to hold to works notoriously admitted to be wholly or partially failures, rather than to study from the many good ones scattered over the country, and which are in a course of constant improvement.

That we are, however, coming into a *new era* in respect to railways, is to us very clear; and it is equally plain that the subject of the relative security of investments, or their comparative exemption from the chances and contingencies to which all are more or less subject, has by recent developments, become of anxious consideration with the capitalist.

In looking, therefore, at a railway opening in these days, it must be evident that the more public and visible nature of its operations, must in a large degree guard its funds from being greatly misused or its true condition from being long concealed, which happens too commonly with many investments, and with some moreover, that have perhaps been the most favorite, *in which money is constantly handled*, the temptation becomes very often too strong *at last*, to be resisted.

Investments in railways have already been extensive, and we feel persuaded that they will continue to share the money of the capitalist, if he be given *and will seek light*, to see and distinguish what is and what is not eligible among them. In nothing is a wise discrimination more necessary than in judging this article, and the existence of this qualification is certainly not too common.

No. 40.

The security of the Philadelphia and Pottsville railway against *a liability to damage* by freshets, is an important fact. The freshet of 1839, was, perhaps, the most violent ever experienced on the

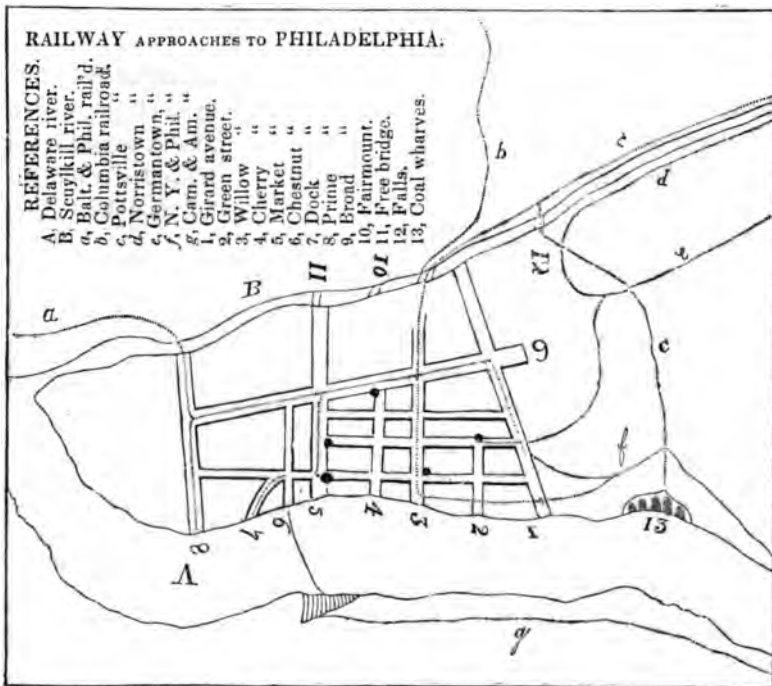
Schuylkill, and the road escaped untouched. The Pottsville Journal, speaking of the freshet of the 8th January, 1841, remarks:

“We learn that about \$60,000 will repair the damage to the Schuylkill Navigation, sustained by the great freshet of last winter.”

“The repairs on the Lehigh canal will cost \$300,000 before any coal can be passed on the canal, and about \$150,000 more will be required to make the canal as permanent as it was before the freshet.”

“So trifling were the damages sustained by the Philadelphia and Reading railroad by the freshet, that the regular travelling was not suspended a single day.”

No. 41.



The above sketch will show the various approaches to Philadelphia by railway, and the position of their several depots; but the purpose for which it is most useful, is to show that where a want of

unity of connection in the terminations of a line is most detrimental, is on that between New York and Philadelphia. In note No. 8, we have already shown what could have been done on this important avenue, had it been so fortunate as to have taken a right direction at the outset. There is yet the opportunity to retrieve, in good part, this misfortune, if it be correct that the Camden and Amboy Railroad Company are about relaying the track between Philadelphia and Trenton with an edge rail, thus forming a continuous line between Jersey City and Philadelphia, of which the Camden and Amboy Company would control 53, with only 10 feet grades, and the New Jersey Railroad Company 34 miles, with 26 feet grades per mile, together 87 miles, a distance which could easily be overcome in 4 to 5 hours, in place of 6 and 7 hours, as at present. That between Stonington and Boston, 90 miles, is run in $4\frac{1}{2}$ hours. These three hours alone, are *an immense loss* to the community and to the railway, estimated on a year's operations in travel and business.

It remains then but to perfect the termination to this line by carrying it into Broad street at Philadelphia, as indicated in the sketch, where it would connect with lines leading to all the cardinal points of the compass, making of that street, as it would seem designed for, a great caravansary, to which the traveller could always be referred without loss of time or fear of mistake. The Baltimore and Philadelphia Railroad Company are said to have the privilege of making this connection; and in a matter, also, so nearly concerning the interests of the city of Philadelphia, we should hope that her authorities would give every aid and facility in effecting it, say through the avenue which is now partially opened and intersecting Broad street at Green Hill; as well as to see that no difficulty occurs as to exactions for right of way, and in removing any little *bar* of private interest which might oppose itself to the consummation of an object in every way so very desirable to her, as to make it indeed worth her while to contribute largely to it herself.

Under the present separate system of management on this line, the business for 1839, was as follows :

CAMDEN AND AMBOY RAILROAD COMPANY.

By receipts in 1839, 181,479 passengers, 13,520 tons
merchandise, equal to 40 tons per day, - - - \$685,300

To expenses in 1839, with 17 locomotive, 64
passenger, 71 baggage and freight cars, and 8
steamboats, - - - - - 258,000

NEW JERSEY RAILROAD COMPANY.

By receipts in 1839, in travel, etc., etc. - - - 233,800

To expenses in 1839, with 10 locomotives, 31
passenger, 15 baggage and freight cars, - 116,700

*Would not the dispensing with the steamboats
and a reduction in number of locomotives, by
one line, be equal to saving of near 10 per ct.,
or \$92,000 on this expenditure? which is now
equal to about 40 per cent. on gross receipts.* 374,700

To surplus to the two companies, - - - 544,400

\$919,100 919,100

Now with the travel and light freight thrown on one im-
proved railway, with its terminations made complete,
which do so much to invite or to check either travel
or traffic, it could be no over-estimate to state the
whole receipts per annum at - - - - - 1,000,000

From which take 30 per cent. for expenses, agreeably
to the experience adduced below, - - - - - 300,000

And from which take further, 700,000

Dividend on 2,900,000 capital of Canal and Cam-
den and Amboy Railroad Co., 10 per cent., 290,000

Dividend on 2,000,000 capital of New Jersey
Railroad Company, 10 per cent., - - - 200,000

Interest on 3,500,000 loans about, of Camden
and Amboy Railroad and Canal Company 5½
per cent., - - - - - 192,500—682,500

Surplus, - - - \$17,500

There would then be the Delaware and Raritan canal, and
the Camden and Amboy railroad. The former now pays some sur-
plus over its maintenance and repairs, and with the prospect of
the whole New York coal trade of 3 to 400,000 tons seeking it as
the cheapest avenue, which at any rate it could be made, it will ere
long be enabled to pay the interest on its cost of \$2,850,000, even

though the perfecting the railway route might substract something from its present receipts, which as a common fund would not then matter. The Camden and Amboy route, by its mixed character and higher grades of 42 feet, is less suited to advantageous freighting, and would do better as a subsidiary line, slow and cheap for emigrants during the summer months only, in connection with the tow boats, touching at Amboy on their way to the canal at Brunswick. These two concerns could then assist to relieve the heavy interest on loans, now all charged against the joint railway concern, which would be thereby enabled to increase its dividends, or at least prevent their falling below 10 per cent. per annum.

Free trade, or a modification of imposts, is now a favorite topic of the day, and as kindred to it, high rates of fare and freight, having been found to check internal as much as high duties do external commerce, a judicious reduction of them has had the effect on all main avenues to increase both revenue and profit. Where a tariff of this sort would add much to the traffic and receipts, particularly from freight, under the circumstance of a continuous through line, is between New York and Philadelphia. Instead, therefore, of charging \$17 nearly per ton on merchandize for 87 miles, it would be advisable to begin at \$10 per ton as the highest, and so down, according to the value of the articles.

In England, for 100 miles, the charge is on merchandize about \$10 per ton ;

On Columbia railway, 82 miles, the charge is on merchandize \$7½ per ton ; with inclined planes and 42 feet grades to overcome.

New York to Boston, by steamboat and railway, 250 miles, the charge on merchandize is about 7 to \$7½ per ton ; with 30 to 35 feet grades to overcome.

On Massachusetts railways, 5 to \$6 is the common rate for 100 miles.

On Baltimore and Ohio, 85 miles, the charge is on flour, about \$4 per ton ; with grades of 80 feet to overcome.

On Georgia railway, 100 miles, the charge is on cotton, about \$5 to \$6 per ton ; with grades of 50 feet to overcome.

The maximum at which we would fix the charge for main routes, on all ordinary merchandize, is \$6 per ton for 100 miles. Goods coming under the denomination of measurement would of course be differently rated. All the above roads place a high value on their *freighting business*, which it is well known now forms a very profit-

table part of the business of the Camden and Amboy line, and as a specimen we quote what is said of it on the Boston and Worcester railway.

“The present amount of freight exceeds 30,000 tons annually, and the *profit divided* from it affords an important part of the revenue of the road, and constitutes too important an interest to be sacrificed to any doubtful experiments.”

On the above road, with grades of 40 feet per mile, their statements show there was carried over it in 1838 and 1839, freight to the amount of 53,680 tons for \$49,750, comprising merely the charges for transportation performed in 1824 trips of 45 miles, with irregular loads averaging about 47 tons, which gives a cost per trip of \$27, or equal to \$52 per trip of 87 miles between Jersey City and Philadelphia. This is equal to 90 cents per ton, for the Boston and Worcester road, by doubling which, or at \$1 86 per ton, it covers all other charges save interest on capital. This cost, is corroborative of our estimates in note No. 13, agreeably to the loads there assumed to be carried, and bearing in mind the allowances to be made for differences in road and machinery, etc. If then the rates of freight between the two cities were judiciously adjusted, and every despatch attained in the delivery of it, there could scarcely be less than 100 to 150 tons per day exchanged between them—which could be hauled in one train were it practicable to obtain it regularly; but at only 52 tons each way, the cost would be only \$1 per ton, to which add \$1 per ton to cover all other charges of repairs, renewals, incidentals, etc., there would still be left a fair surplus to pay interest and profit on capital, at a maximum charge of \$6 per ton. Few points are as well adapted as this line to beget *by encouragement* a large and regular freighting business, and New York could thus in reality be made the seaport of Philadelphia, and the ride between the two, at suitable speed and fares, would soon be looked upon as only of an omnibus character. For \$5 the traveller should be able to pass during daylight between the two cities, after spending 4 to 5 hours in either.

They have now 8 wheel engines on the New Jersey road, equal to the draught of 150 nett tons freight over the road; and to show the number of trips per annum an engine is capable of performing, we extract the following from the Report of the Boston and Worcester railway of 7th June, 1841:

Meteor, Lowell,	run 29,721 ms., equal to 330 trips per an. of 90 ms.	Cost of repairs, \$617
Elephant, Baldwin & Co.,	20,553 " " 228 " "	" 420
Tartar,	" 22,818 " " 253 " "	" 804
Mars, Norris,	25,558 " " 284 " "	" 758
Vulcan,	" 21,017 " " 233 " "	" 351

The distances were run in trips of 45 miles over 40 feet grades, while over the Jersey road it could be easier done in 90 mile trips, over grades of only 26 feet—and on a level, or slight descents, as on the Philadelphia and Pottsville railway, it would be still easier, and fully confirms the ability of an engine accomplishing the 100 trips with coal and at the same cost of repairs, that have been allotted to it on that road.

The experience we have to offer as to the proportion of expenses to the gross receipts, assumed above at 30 per cent., is derived from the Utica and Schenectada railway, with grades of 26 feet to the mile, a *flat rail*, and 78 miles long, as compared with the line between Jersey City and Philadelphia, which has similar grades, the advantage of an *edge rail*, on which the expense for maintenance of way is given at \$320 per mile per annum, while that on the former is \$482 per mile; is only 9 miles longer or 87 miles in all, and all the other items of expense averaging nearly the same, there is no reason that we can see, to vary the result. The official returns on the Utica and Schenectada railway, are as follows for 1840:

TRANSPORTATION.

General superintendence, clerk hire, etc.	-	\$6,635
Collectors, breakmen, attendants,	- -	9,684
Repairs to cars, - - - - -	-	7,111—\$23,430

MOTIVE POWER.

Eight engines—average for each per an., \$5,044, making each 235 trips on the average, or \$21½ for each trip.

Wages to engine drivers, firemen, station attendants, - - - - -	-	9,164
Repairs to locomotives, - - - - -	-	9,992
Oil for engines, cars, stations, etc., - - -	-	2,268
Fuel for engines, stations, etc. - - -	-	18,933— 40,357

MAINTENANCE OF WAY.

Repairs to roadway, improvements, fixtures, etc., for 100 miles, with turnouts, - - - - -	-	48,192
---	---	--------

Brought forward, \$111,979

MANAGEMENT.

Salaries to Secretary and Treasurer, damages, insurance, advertising, etc., - - -	7,886
	<hr/>
	\$119,865

CHARGES EXTRAORDINARY.

Repairs to Mohawk turnpike, - - -	3,695
Taxes in poor rates, - - - - -	13,660— 17,355
	<hr/>
	\$137,280

The receipts in 1839, were \$400,700; expenses, (less extraordinary expenses,) \$113,700, or 28 per cent.

The receipts in 1840, were \$380,411; " " " \$119,865, or 31 per cent.

It is well known that the business on all railways fell off in 1840 with the general prostration of the country, and which may continue to operate for some time.

Take also six of the principal railroads in Massachusetts of short lengths, and making together 161 miles, on which was received in 1839, for freight and passage money, \$1,025,600, at an expense of \$435,900, or of 43 per cent. thereon. Now allowing for the disproportionately large equipment on short lines, and the generally smaller business on each, there can be no doubt that these six lines reduced *to one*, could, on an expenditure of \$435,900, be made to take \$1,500,000, reducing the per centage to 30 per cent., and about this ratio of expenditure is further borne out by one or two instances in the table in note No. 13 on this particular subject. The Utica and Schenectada railroad, above adduced, is worked thus cheaply, for the reason that they are enabled to avoid all waste in expense of extra machinery or multiplication of establishment, which could be at least as effectually accomplished on this line between Philadelphia and New York. There is now, unquestionably ONE MILLION of dollars and upwards to be taken between these two cities in traffic and travel, and it remains only to secure them at the *least possible outlay*, which at the outside should not be made to exceed $33\frac{1}{3}$ per cent. of the gross receipts.

The importance of the improvement here contemplated, cannot be overrated; and it will be matter of much regret if the intelli-

gent gentlemen in charge of these now separate concerns, are unable to overcome the difficulties in the way of reducing them to one line and of concentrating all their forces thereon; which it would thus seem, must have the triple effect of *increasing the dividends of the stockholders, adding to the accommodation of the public, and doing good to the cause of railways.*

No. 42.

In thus speaking of the Philadelphia and Pottsville railway, it is taking a wide scope to say the "cheapest in the world," etc., but a reconsideration of the phrase does not induce us to relinquish it, and as some assistance to the reader to make the comparison for this country, we give the cost per mile of some of our prominent roads.

Camden and Amboy, equipt,	61 m.,	\$53,200	} Phila. and Pottsville, equipt, 100 m. \$50,000.
New Jersey,	34 "	58,800	
Philadel. and Baltimore "	97 "	45,300	
Columbia,	62 "	58,000	

It needs but an insight into the *many disabilities* still attaching to the above roads, even after so heavy a cost, as compared with the *open and clear field* in which the Philadelphia and Pottsville railway will operate, to impress the mind with the comparatively *gigantic power* of the latter, and of the *peculiarity* of that power being placed where its utmost exercise will be required.

The first manifestation of this power, in bringing down both the price of coal and iron, will operate as a broad ray to light up *Philadelphia and her dependencies for these necessities*, to their true interest, which is simply not to withhold any appliance of confidence and facilities to the road, which shall fully elicit from it the *immense economy* of which it can be made capable, more particularly as regards these two articles of universal demand. It would have been a conception worthy of the highest philanthropy, to have built this road by a minute division of its cost among the communities of Philadelphia and all the cities east of her, that whatever could be economised over 5 per cent. and a sinking fund to redeem the cost, should go to the benefit of the public.

Finally, we persuade ourselves that few on fairly reviewing the subject of the railway, will not come to the conclusion that it stands on a broader foundation than is commonly supposed, which is moreover daily widening, differing so far from the rivals it has already outstripped, in being always progressive; witness the very recent in-

vention of Messrs. Spaulding and Isherwood, Engineers on the New York and Erie road, of an entire superstructure of *cast iron*, a full account of which, will be found in the Railroad Journal of 1st July, 1841.

And as regards the useful arts, it here occurs to us to add how much good would flow from an appropriation by Congress, of a sum vested in a Board of Science for the aid of inventive genius, the largest share of which is found in that class unable of their own means to bring it into play. Patent fees should be at least abolished, and an example set to England, where the office is inaccessible under \$1500, a sum prohibitory of the exercise of much poor talent and ingenuity.

No. 43.

The following statement, in addition to note 25, on the onward progress of railways, shows in what little time in England they unfold their resources, where they have left no doubt of their superior usefulness on the public mind, which has got to understand clearly their immense value, beyond the mere rental they may yield.

Liverpool and Manchester opened Sept. 1830,	}	In ten years the receipts had increased
	1840.	240 per cent
Grand Junction, " July, 1837,	}	In three years the receipts had increased
	1840.	90 per cent.
London and Birmingham, " Sept. 1838,	}	In two years the receipts had increased
	1840.	66 per cent.

And in 1841, they all show further progress. In this year, on 1st July the Great Western Railway, London to Bristol, 118 miles, was opened, and their whole scheme of railways in England is advancing rapidly towards completion, destined to give an almost incredible scope to her industry and consequently to her power, which will have the good effect of forcing into the same career, as a defensive measure other nations, who, although they may maintain the couched attitude of the tiger towards each other, will, as we have before observed, by the insensible operation of this improvement, be led and kept in the ways of peace and charity. The London Railway Sun of the 9th July, 1841, conveys clearly how England is now, and will be further intersected by it.

As evidence that it has not lost its impetus in this country, we may state that the history of railways will be distinguished towards the end of the year 1841, by the opening of two very important roads—the Philadelphia and Pottsville, of 100 miles, of which we have

already given a full account, and the Great Western Railway, Boston to Albany, 200 miles, which has already been incidentally alluded to, but which is deserving of a far more extended notice, as redounding fully as much to the enterprize of Massachusetts, as did the Erie canal *in its day* to the State of New York.

The character of this work, is of the most substantial kind, the weight of rail being 55 lbs. to the yard, and will form a continued railway connection from Portsmouth, N. H., to Batavia, N. Y., of 530 miles, and will finally reach Buffalo on Lake Erie. By the fast lines they will be enabled to pass between Boston and Albany in 8 hours, in less time than it now, on the average, takes the steamboat to go from New York to Albany, and having already carried the expresses from the British Steam Packets, at the rate of 40 miles per hour, they can on emergencies pass between Boston and Albany in five to six hours.

This great avenue was projected on the enlarged view of the public benefit, being almost entirely a State work, which looks only to being secured an interest of 5 per cent., all over which, and a small sinking fund to redeem the principal, is intended to be applied to the advancement of the commerce and the development of the resources of the State by the lowest possible fares. The map accompanying the article on the Albany and New York railroad, gives the line of country which it traverses, and presents it as a backbone, having already on each side leading to the Sound, attached to it, the *Norwich*, the *New Haven*, and *Bridgeport* railways, as three ribs, while time will beget as many on the other side, leading north to the minerals of New Hampshire, and to the wool, etc., of Vermont. The prospect of way travel and freight, therefore, would seem immense, and of itself sufficient to maintain this road, and on this should it principally depend at first, until the whole line is perfected to Buffalo.

If then from that source it should nearly pay its expenses, interest and sinking fund, it will be able to offer great inducements by low charges for the through freight and travel, and the western produce arriving in Albany, may thus in good part be diverted to Boston, where better prices will more than cover the extra charge, over the cheap rate by the Hudson river to New York. In the present season, a barrel of flour has been delivered in New York from Buffalo for 75 cents, comprising 33 cents toll, 32 cents canal and 10 cents river ^a **The up freights, it has already been shown, have through**

competition, been reduced near one-half, and the general complaint is, that they are losing rates ; that is 60 cts. on heavy and 70 cts. per 100 lbs. on light goods: if they are not so, the old rates were far too high. The average annual increase of tolls on the New York canals, is about 5 per cent., and has so far in the present year rather exceeded that ratio.

From conversations with parties acquainted with the views of the directors of this great work, and from intimations that have appeared in the public prints, we are happy to find that in regulating their rates of fare and freight, they will not be governed by any narrow or obsolete views that may restrict their business to a retail trade. The cost of transportation is here well understood, the experience being furnished by 45 miles of their own line, the Boston and Worcester, where, for instance,

In 1838, the business was done for \$104,300, running 108,300 miles,
 1839, " " 122,800, " 122,300 "
 equal, say to about one dollar per mile of travel, or on a load of 100 tons for this road, to two cents per ton per mile, which, it must be understood, covers every charge save interest on capital. This result, from so *short a line with such limited and irregular business*, is a sufficiently safe guide, and based on this, the rates that would be most safe for the Western road, would perhaps be $2\frac{1}{2}$ to 3 cts. per mile for the through travel, and 3 to 5 cts. pr mile pr ton on merchandize, according to its value. A road, however, must have been open about a year to afford a true idea of its scope of business, by which alone a *just medium* of rates can be attained, and hence the necessity of starting cautiously. It is here again evident that on a well appointed railway, the mere cost of transportation cannot be made to exceed the freight on a canal, usually *one cent. per ton per mile*,* independently of toll, and on a level road we have shown it is less than one-half the cost of freight for the same distance, and doing an equal business.

Boston will doubtless use her present opportunity to the utmost to

* This one cent per ton pr mile, is barely enough to cover the present expenses of transportation on the Erie canal, between Albany and Buffalo. The enlargement now prevents a boat making a full trip to and fro, under 25 days, in place of 16 to 18 days as formerly, and the whole expense round to include wear and tear and renewal of boat is not less than \$350. The canal boats are fitted for passengers and cost between 1,600 and \$2,000, and last about seven years ; they carry of *down freight* about 40 tons, and of *up freight* 20 tons, which would make a cost of near \$6 per ton. At the old rate of 16 to 18 days per trip, the expense is about \$275, or \$4.60 per ton on the canal, the river freight is besides, 10 cents on heavy and 20 cents on light freight, per 100 lbs., 150 miles to Albany. A passenger by the Erie canal, pays \$3.63 for the whole distance, or 1 cent per mile. The present rates by canal, are complained of as not paying cost, and will likely rise towards the fall.

win the western trade to her port, which she will be free to do at any rate, for three to four years, and as much longer as it may be possible to keep New York in her present sleep, in regard to the importance of making a similar connection with Albany.

No. 44.

To convey an idea of the magnitude of the trade which seeks Buffalo for a vent through the New York canals, we annex a list of the principal items which reached the Hudson by that route in the year 1840.

Boards and scantling,	-	-	-	124,174,000 feet.
Staves,	-	-	-	24,500 tons.
Ashes,	-	-	-	31,400 barrels.
Beef and pork,	-	-	-	89,500 "
Flour,	-	-	-	1,834,000 "
Salt,	-	-	-	2,600 "
Wheat,	-	-	-	1,560,000 bush'ls.
Tobacco,	-	-	-	260 tons.
Making of descending produce, reaching tide water,				tons 669,000
The ascending merchandize for 1840, was	-			" 129,000

The States which supplied in part the above produce, were the following :

	Bushels of Wheat.	Barrels of Flour.	Barrels Provisions.	Barrels Pearl Ashes.
Ohio, from Cleveland and Toledo,	725,000	505,200	19,700	5,600
Michigan, " Detroit and Monroe,	97,200	112,200	2,000	1,000
Indiana, " Michigan City, -	48,300	13,700	480	
Illinois, " Chicago, - -	10,600	2,300	2,600	
	<hr/> 881,100	<hr/> 633,400	<hr/> 24,780	<hr/> 6,600

The advantages of a railway connection with Cleveland are here apparent—in such an event, the surrounding States would make it the great rallying point in which to centre all their produce for distribution—at present its cheapest and principal vents are through the Welland canal to Canada, and the Erie canal to the Hudson, and next will come the Cross Cut canal to Philadelphia, when its lines are all properly connected. A railway is not likely to be constructed for some years to come, but it is in that direction that Pennsylvania must fix her attention, That she is yet full of resources, the

following statement of them as given in the Harrisburg Intelligencer, will be gratifying to her friends.

Population, per census of 1840, hardy and industrious, 1,724,000
 Square acres, "smiling with plenty," - - - 28,000,000

Estimated Real Estate.

Value of land,	-	-	700,000,000
" houses,	-	-	300,000,000
" barns, workshops, factories,			200,000,000
" railroads, canals, 1700 miles,			100,000,000—\$1,300,000,000

Estimated Mineral, Agricultural, etc., Products.

Grain 62 million bushels, etc.,	-	124,600,000
Pig and cast iron,	-	14,000,000
Anthracite coal mined,	-	5,000,000
Bituminous coal, at Pittsburg, etc.,		4,000,000
Cotton, woolen, leather, engines, etc.,		13,000,000
		<hr/> \$160,600,000

The public lands to which the Indian title is extinguished, amount to 220 millions of acres, and the unextinguished, 730 millions, of which one-tenth belongs to Pennsylvania at \$1.25 per acre.

The whole public debt of Pennsylvania, created almost entirely for internal improvements, is now about \$36,000,000, the interest on which, is about \$1,800,000, for which there is now ample provision, besides a sinking fund to extinguish the principal. Her public works will annually become more productive and will finally pay for themselves. The whole debt at present does not exceed 3 per cent. of the estimated value of the real estate pledged for it. Her solvency, therefore, is beyond a question. Once enabled to deliver her coal and iron at all seasons at tide water, and a connection effected by railway between her metropolis and Cleveland, crowned with a perseverance in honest legislation, she will be sure to maintain her accustomed rank abroad and among her sister States.

In order to convey clearly the different items of expenditure to which canals are liable, we subjoin a condensed view of those on all the New York canals, taken from official documents for the year 1840. Luckily for New York her *main lines* are subject to few extraordinary demands, and thus placed as almost the only outlet to

the seaboard, for the above mass of produce, they have necessarily been very profitable. That mass of produce must annually increase, and railroads will ere long be *called* for as the cheapest mode of getting it to market.

Locks, new, and repairing old,	-	-	-	72,000
Tending locks, and oil for gates,	-	-	-	57,400
Repairs to aqueducts, waste weirs, culverts, and weigh locks,	25,900			
Repairs to tow-path, road and farm bridges,	-			32,400
Scows, small boats, ice breakers and excavators,	-			10,600
Lock houses, work shops, watch houses, store houses, and piling machines,	-	-	-	3,600
Raising tow-path, berm bank and slope wall, and cleaning out bottom of canal,	-	-	-	102,400
Repairing dams,	-	-	-	17,300
New slope wall, docking, and repairing breaches,	-			39,300
Breaking ice, watching canal, tools, etc.,	-	-		18,900
Salaries of superintendants and clerk hire,	-	-		23,800
<i>Other miscellaneous expenditures,</i>	-	-	-	55,000
				<hr/>
				\$458,600
				<hr/>

As giving a correct view of the ordinary items forming the current expenses of canals, the above will answer a good purpose.

ABSTRACT OF POINTS,

ILLUSTRATED BY THE NOTES.

As the notes in fact contain the real matter explanatory of the railway in itself and as it compares with the canal and navigable river, a ready reference to each particular point explained by them, will be most likely to attract by not wearying the attention of the reader on this dry but important subject. The following abstract is to effect that object, and being enabled to get at once to any one point of particular interest, his curiosity may be further aroused and quickened into a gradual examination of them all. He will then be able to judge what little foothold of truth, the present condition and future prospects of the railway, can yet have in the public mind, and how much it needs investigation. Our present attempt is not offered as anything more than an INDEX by which that desirable object will be assisted and promoted, and it will have answered its purpose, if it but lead others to an abler and fuller exposition of the subject.

In impugning any of our statements, care only must be had, not to be misled by single instances of opposite results, and to be sure that the things compared are alike, as our positions are founded on the working of a *modern road with modern equipment*, to which those of older date have but little or no analogy. The variance in working different roads may be recalled to the reader by the two extreme cases before cited by us.

Georgia R. R. 105 ms.,	did its business in 1840	for 60 cts. pr m. run.
Bos. and Wor. 45 ms.,	“	1839 for \$1 “

And why this difference? Because the first is of the most economical length, the price and quality of fuel south, puts the motive power at half cost nearly, and slave labor is also cheaper. Thus will every road vary, one way or the other, and 75 cents per mile run, may be taken as a fair average, to cover all expenses, save inter-

est on capital. No road will be found to fall more under that average than the Philadelphia and Pottsville.

1. Oliver Evans in 1789, and Col. John Stevens in 1812, were among the first to direct their attention to railways in the United States.
2. The performances of several locomotives, given, to show their power on a level, to be equal for 11 ton engine to a gross load of 500 and a nett load of 300 tons. Also a calculation of expense, running a locomotive between Philadelphia and Pottsville with her train of 50 cars, or for 100 miles, which can be made to apply to any road.
3. The power of a locomotive of 10 tons, equal to 230 tons gross or 152 tons nett load over a grade of 19 feet per mile.
4. The expense of greasing car wheels about $1\frac{1}{2}$ cents per ton for 188 miles, a mere fraction at any rate.
5. The general expenses, as estimated for the Philadelphia and Pottsville railway for motive power and freighting, as originally made, shown to have been full high by the experience on the road itself.
6. Showing that if the charge for carriage of a passenger is \$3, and that for a ton of coal \$2, yet that the latter is the more profitable business, there being 20 tons of coal to carry at the saving speed of 10 miles per hour, for one passenger at the *expensive* speed of 20 miles per hour. Reasons why coal has never yet been carried over a certain limit of distance, and on the folly, in consequence, of restricting the practicability of carrying it to that limit.
7. List of sundry improvements in different States, showing a wasteful and unnecessary expenditure. On the necessity that canals are under to carry at rates below the cost of transportation on them, and on the false impression thus created of their being cheaper carriers than railways.

8. The leading railways, such as the Camden and Amboy, Philadelphia and Baltimore, and Columbia, exhibited in the light in which they would appear if divested of the extraneous causes which now diminish their success.
9. The just weight of iron rail yet undetermined, the adequate mean seeming to lay between 50 and 60 lbs. per yard. The greater power of the locomotive on an edge rail, and the saving thereby in general wear and tear, as compared with a flat rail.
10. The travel on the Philadelphia and Pottsville railway likely to be considerable, if the policy of making a *focus* of it by low fares be adopted. Pottsville should be to New York for *fuel* what Albany is to her for *bread*, and she is equally interested with Philadelphia in a cheap and quick avenue to that point.
11. The fitness of the railway as now constructed to carry *freight* advantageously, proved by experience in this country and in England.
12. The advantage which *long lines* of railway afford in economy of management and general profitableness as compared with short ones.
13. The proportion of expenses to the gross receipts given from several roads. The views of the monied circles in England as to the security of railways for investment as given in the Banker's Circular. Table of the business loads carried over certain grades, with the approximate cost of transportation on each per ton for 100 miles.
14. That canals as carriers are cheaper, or are less expensive to maintain than railways of the present day, shown to be untenable, and that the reverse is true. A statement of fares by steam power contrasted with those by ordinary means, to show that the former are cheapest and preferred at much higher rates.
15. The connection to be formed with the New York improvements at Elmira will bring the far western and northern travel through the valley of the Schuylkill as the nearest route to the sea board, and the importance of this union alluded to by the Governor of Pennsylvania in his message of this year.
16. The great capacity of the railway for business in freight and travel, shown by the Stockton and Darlington, being principally a

coal railway. A suggestion as to the most economical mode of transporting large amounts of tonnage, by distributing it as near as practicable through the different months of the year. On the advantages of low rates of fare and freight in England and on the continent.

17. The prospect of a great extension of the iron trade in the Pennsylvania coal regions, of which the vent must ultimately be the valley of the Schuylkill. The cost of manufacture, etc., at Pottsville.
18. The rapid strides in arts and mechanic sciences, all over the world, warn us not to fall *behind the times*, but to follow up the experience of the day, always eliciting something useful. Exemplified by the notions entertained of railways, especially in the State of New York in 1835, and what they are at the present day.
19. The question of grades as now viewed in England, much changed of late by the improvements in motive power, 40 to 60 feet to the mile being no longer considered any great obstacle in attaining the requisite speed.
20. Showing the termination at Richmond, above Philadelphia, of the Pottsville railway, to be the best site for a National Foundry.
21. A list of expenditures on a canal, to show the numerous occasions thereof. Large annual appropriations required for the canals of Pennsylvania, with some reflections thereon.
22. The first impression as to the comparative expensiveness of the railway shown to be an erroneous one. The sills and bridges for instance are set down as costly to renew, but this is not found to be so when examined, and so on throughout all the other items of expenditure in the comparison with those on a canal as per sample given in note No. 21. The wooden portion of the railway likely to become cheaper hereafter, by the substitution of coal as a fuel.
23. The wastage on the coal during its long passage down the Schuylkill canal apparently irremediable, and only to be cured by its *quick* transit over the railway.
24. The freighters or boat owners on the Schuylkill canal, having no concern therein, will find and of course follow their own inter-

est in transferring themselves to the Delaware for the export trade, for which they would be principally wanted.

25. Showing the constantly onward progress of the railway, that they have about doubled their business in five years. A statement of the great success of the Utica and Schenectada railway given, being a model for judicious and economical management.
26. The duty of government is to foster and encourage railways as we find is the case in England and on the Continent, and that they are least of all objects for taxation. The sooner we can bring this improvement to be held in equal estimation among us, the better, and this can be done only by first understanding and then patronising such railways as the Philadelphia and Pottsville, and other standard works.
27. The current high prices of coal during the cold months, and the suffering thereby, to be only remedied by a railway to the Delaware, when instead of fluctuating from 7 to 8, it will be steady at 5 to \$6 per ton. Some statistics respecting bituminous coals, foreign and domestic given.
28. On the rapid extension of the railway system in the last ten years, and on their relative costs here and in England.
29. On the importance of the Schuylkill region maintaining its ascendancy in the coal trade, secured to it by the cheaper rates of transportation by railway and canal, from that region, as per details given in regard to the mere cost of delivering white ash coal in New York. The valley of the Schuylkill, is likely the soonest to require both these means to discharge its trade.
30. Facts in regard to the New York and Albany railroad, showing its ability to compete in travel with the Hudson river, far more curious than the Philadelphia and Pottsville railway pretending to vie with the Schuylkill canal. Comparison of cost per mile of running a steamboat and a railway train, being less by the latter.
31. The collateral advantages of the railway, more particularly appreciated in Massachusetts. Estimated to save three-fourths of the cost of transporting persons and merchandize in that State.

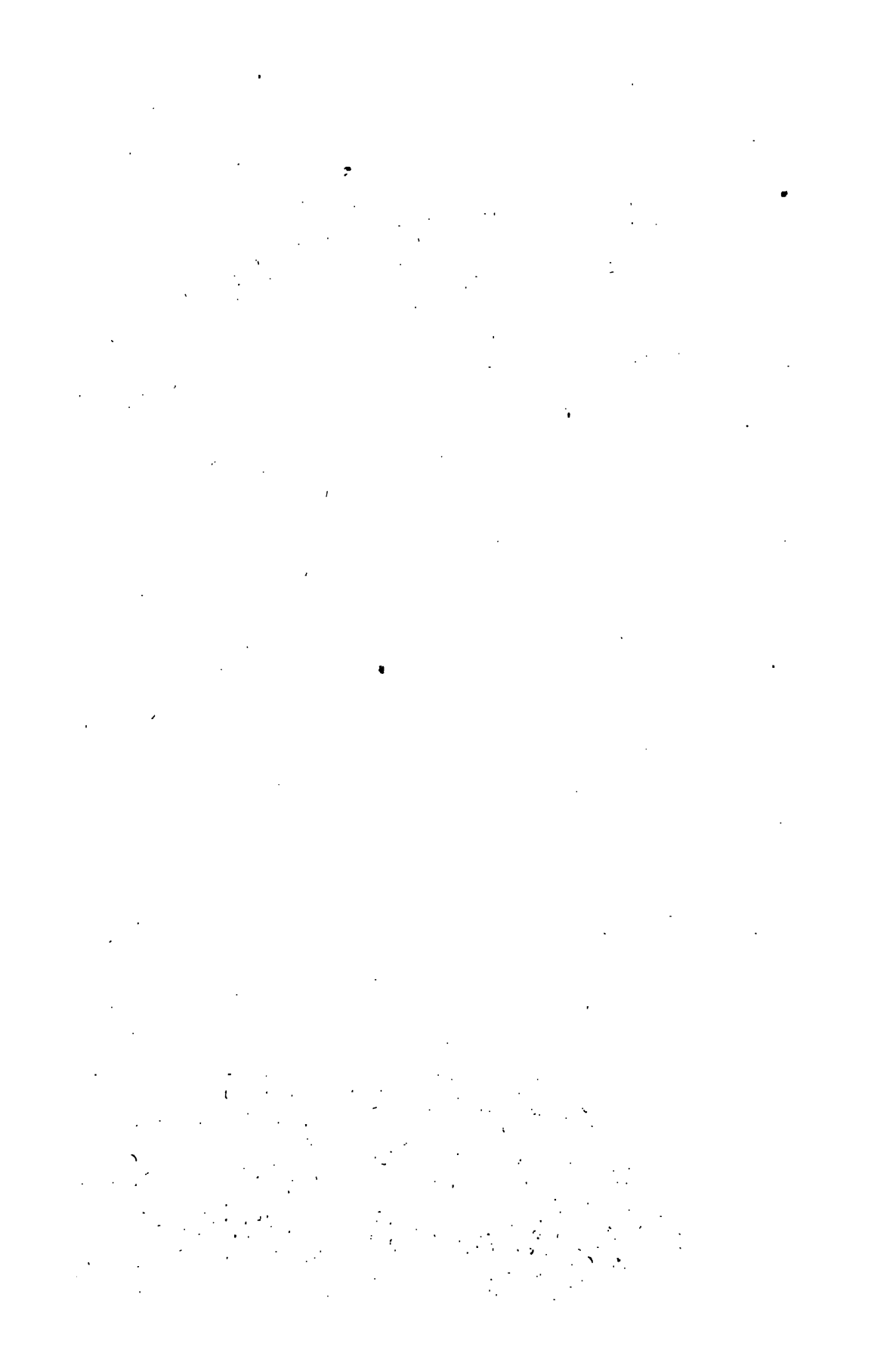
32. Facts in regard to the New York and Erie railroad, illustrates the advantages of long lines, with other statistics in regard to the relative costs of transportation to the lakes by canal and railway, the latter being able to carry *under the cost of freight alone* by canal.
33. The safety of railway travelling now fully established and of which there is daily proof.
34. Showing the hostile interest opposed to the Philadelphia and Pottsville railway, the consequence only of those rivalries which beget all improvements—and noting two of the latest, as affecting the economy of railways.
35. Statement of the Columbia railway : an attempt to unravel its management, and that if this could be got right it would be profitable. It is now working under better auspices.
36. New Jersey railway, showing its large *way travel*, and its success in competing with the steamboats to New Brunswick, the latter charging $12\frac{1}{2}$ cents and the railway 75 cents. A misfortune that it is not a continuous line to Philadelphia, where it could so easily deliver the traveller in 4 hours.
37. The Ericsson Propeller. Its probable use on canals and rivers.
38. Reasons for the General Government, through the Post Office, assisting the carrying out main railways, as part of the system of aid proposed to be given to ocean steamers. On their moral influence, etc., etc.
39. Hasty and unfair judgments passed on railways, without discrimination of the bad from the good. A new era coming in railways, when their security and usefulness will be better appreciated by the capitalist.
40. On the freshets of the Lehigh and Schuylkill rivers, and the complete security of the Philadelphia and Pottsville railway against the latter.
41. On the want of a unity of connection on the line between New York and Philadelphia, and on the advantages of making *one efficient line* between the two cities with suitable terminations

The specimens of the good and bad abound on this line, and if properly studied, are sufficient to enable the student in railways and canals to acquire a perfect knowledge of the subject.

42. A comparison of the cost of several roads, as illustrating the comparatively moderate cost of the Philadelphia and Pottsville railway. On the progressive character of the railway as compared with the stationary one of the canal. The advisableness of aiding poor inventive talent by government, or at least that it should not be subject to any expense for patenting its products.
43. Further evidence of the onward progress of railways—and also a more extended notice of the Great Western Railway from Boston to Albany. See map attached to note No. 30, showing line of and connections with this road; also the position of the canals which have been superseded by railways referred to in note No. 14.
44. Statement of the produce which reached tide water through the New York canals in 1840, and the States from whence it came, in part. A condensed view of the expenses of all the New York canals for 1840, and a sketch of the resources of the State of Pennsylvania.











HE 2771 .P4 S6 C.2
Sketch of a railway judicious!
Stanford University Libraries



3 6105 041 827 994

Stanford University Library
Stanford, California

In order that others may use this book,
please return it as soon as possible, but
not later than the date due.

